



**MODERN
STANDARD BUILDING CODE**

VOLUME I

1959

EDITION

MIDWEST CONFERENCE OF BUILDING OFFICIALS

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MODERN **STANDARD BUILDING CODE**

Volume I 1959 Edition

Developed and Recommended by the
MIDWEST CONFERENCE OF BUILDING OFFICIALS

\$6.50 per copy

"The Positive Code"

The Modern Standard Building Code is dedicated by its sponsoring organization, the Midwest Conference of Building Officials, to the safety of the public, orderly development of communities to a desired pattern and standard, and to affording the economic advantages of utilizing advanced techniques, design and modern materials in building construction.

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CODE REVISIONS

The Code is maintained constantly to current developments in the field of building construction by a continuing procedure of the Code Changes Committee of the Midwest Conference of Building Officials, subject to recommendations and approval of the general membership. Supplements of enacted and approved changes to the provisions are issued annually, with a re-issue of the Code each third year. It is a recommendation of the Midwest Conference of Building Officials that supplements of approved changes be adopted upon issue and that each re-issue of the Code be adopted.

EXAMINATION OF MATERIALS

The use of materials, products, or methods of building construction not specifically provided for by this Code shall be subject to approval of the Administering Official, and may be submitted by the manufacturer to examination by the Research Committee of the Midwest Conference of Building Officials under the materials approval procedure toward determination of compliance to the provisions and intent of the Code under performance standards. Members of the Conference are advised of findings of the Research Committee.

DWELLING AND PLUMBING CODES

Also available to Governmental agencies for consideration toward adoption and use are Volume II of the Midwest Building Code, containing provisions to the construction of one and two-family dwellings only, and the Midwest Plumbing Code.

MIDWEST CONFERENCE OF BUILDING OFFICIALS
THE ENGINEERING BUILDING
205 WEST WACKER DRIVE
CHICAGO 6, ILLINOIS

KF Law
5701
M53X
1959

FOREWORD

The Modern Standard Building Code has been developed and is maintained by the Midwest Conference of Building Officials, a not-for-profit, non-political organization of Municipalities, Governmental Agencies and Administrators of Building Regulations of the Midwest States, with finances derived from annual membership dues.

Through cooperative effort of Midwest Public Officials this Code is issued to fulfill the demand for a modern and standard building code, designed and maintained to the specific and current needs and requirements of communities of the Midwest regional area.

Volume I, 1959 Edition, of the Modern Standard Building Code is of performance type in character and contains necessary provisions, regulations and requirements to the construction of buildings of all types and occupancy. Its requirements are minimum to safe and sound construction, as based upon accepted engineering standards. It is positive in its provisions with few 'exceptions' and but a minimum number of 'references' to outside documents.

The Modern Standard Building Code is available to any and all Governmental agencies for use and adoption. In most states, subject to statute, the Code qualifies for adoption by reference. An adequate stock is maintained at the Office of Executive Director of the Conference, and may be purchased either in single copies or in quantity at nominal cost.

Volume I, 1959 Edition of the Modern Standard Building Code, as developed by the Midwest Conference of Building Officials and approved by action of the membership, is published by the Midwest Building Publications, under approval and sponsorship of the Midwest Conference of Building Officials.

Arthur H. Kuhlmann, Chairman
Building Code Committee

December 10, 1958

George W. Doyle, President

Joseph H. Maloney,
Technical Director

John V. Gallagher,
Executive Director and
Building Code Committee
Coordinator.

SUGGESTED ADOPTING ORDINANCE

An ordinance of the City of _____ regulating the erection, construction, enlargement, alteration, repair, moving, removal, demolition, conversion, occupancy, equipment, use, height, area and maintenance of all buildings and/or structures within the incorporated area of the City of _____; providing for the issuance of permits and collection of fees therefor; providing penalties for violation thereof; providing for the establishment of a Board of Adjustments and Appeals; declaring and establishing a Fire District; and repealing Ordinance No. _____ of the City of _____ and all other ordinances and parts of ordinances in conflict therewith.

The City Council of the City of _____ does ordain as follows:

Section 1—That a certain document, three (3) copies of which are on file at the Office of Clerk of the City of _____, being marked and designated as the "Modern Standard Building Code," Volume I, 1959 Edition, as recommended by the Midwest Conference of Building Officials, be and the same is hereby adopted as the Building Code of the City of _____ for regulating the erection, construction, enlargement, alteration, repair, moving, removal, demolition, conversion, occupancy, equipment, use, height, area and maintenance of all buildings and/or structures in the City of _____; providing for the issuance of permits and collection of fees therefor; providing for the establishment of a Fire District; providing for the establishment of a Board of Adjustments and Appeals; providing penalties for violations thereof; and each and all of the regulations, penalties, conditions and terms of the Modern Standard Building Code, Volume I, 1959 Edition on file at the Office of Clerk are hereby referred to, adopted and made a part thereof as if fully set forth in this ordinance.

Section 2—That ordinance No. _____ of the City of _____ entitled _____ and all other ordinances or parts of ordinances in conflict herewith are hereby repealed.

Note: Conflicting ordinances to be repealed should be identified and set forth by number and title.

Section 3—That the incorporated area of the City of
..... located within the boundaries of

is hereby declared to be and is hereby established as the
Fire District, and the area of the Fire District located with-
in the boundaries of
is hereby declared to be and is hereby established as Fire
Zone No. 1, and that all other area within the boundaries
of the Fire District is hereby declared to be and is hereby
established as Fire Zone No. 2, and that for the application
of regulations included in the Modern Standard Building
Code, Volume I, 1959 Edition, all incorporated area of the
City of located outside the bound-
aries of the Fire District shall be referred to as Outside
the Fire District.

Section 4—That fees for the issuance of permits, examination
of plans, installation of appliances or equipment, and re-
newal of Certificate of Compliance and Occupancy for the
application of the regulations included in the Modern Stan-
dard Building Code, Volume I, 1959 Edition, shall be as
follows:

Note: A schedule of fees shall be specified in this adopting
ordinance and shall include—
Construction, repairs, alteration, demolition, moving, siding,
roofing, examination of plans (50% of the permit fee is
recommended), installation of equipment and appliances
(heating, refrigeration, air-conditioning, elevators, etc., un-
less included in other ordinances).

Section 5—That this ordinance shall become effective and be
in force from and after its passage.

Section 6—That the City Clerk shall certify to the passage of
this ordinance and cause the same to be published.

Passed.....195..... Signed.....195.....
Recorded.....195.....

.....
Mayor

ATTEST:
City Clerk.

USE OF THE MODERN STANDARD BUILDING CODE

The Modern Standard Building Code has been designed toward ease of administration and interpretation. Its provisions are contained in ten Articles, each of numerous Chapters and Sections dealing with:

Administrative procedures, as outlined, include authority of the administrative official, provide for the submission of plans and application on proposed construction, issuance of permits and payments of fees thereof, inspection and approval, establishment of a Board of Adjustments and Appeals, and the issuance of a Certificate of Occupancy and Compliance.

Reference: Article I

Phases and terms as applied by the Code are defined.

Reference: Article II.

In using the Modern Standard Building Code the following procedures are recommended.

1—Determination of the Occupancy Classification of the proposed structure or building.

Reference: Section 401.016.

2—Refer to general occupancy provisions.

Reference: Chapter 401.

3—Refer to specific provisions for the occupancy under which the proposed construction is classified.

Reference: Chapters 402 to 415.

4—Check proposed location as to fire zone restrictions.

Reference: Article III.

5—Check provisions of required Type of Construction as determined by occupancy use and location in Fire Zone.

Reference: Article V.

6—Design, structural details and application of materials.

Reference: Articles VI to IX.

7—Installation of heating appliances or apparatus.

Reference: Article X.

8—Fire-resistance ratings of structural assemblies.

Reference: Article VIII.

9—Other departments and jurisdictions should be consulted for possible applicable additional regulations.

10—For further interpretation contact the Building Official.

For interpretation or consultation contact the Office of Executive Director, Midwest Conference of Building Officials, 205 West Wacker Drive, Chicago 6, Illinois, ANdover 3-4340.

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ARTICLE I

Administration

CHAPTER 101

TITLE, PURPOSE AND SCOPE

101.01—Title

The provisions contained within the following Articles, Chapters and Sections shall be known as the "Building Code," may be cited as such, and will be referred to herein as "this code."

101.02—Purpose

The purpose of this code is to provide minimum standards to safeguard life or limb, health, property, and public welfare, by regulating and controlling the design, construction, quality of materials, use and occupancy, location and maintenance of all buildings and structures, and auxiliary buildings and structures thereto, within the territorial limits of the governmental authority exercising jurisdiction and certain equipment specifically regulated herein.

101.03—Scope

This code shall apply to all new buildings and structures, and auxiliary buildings and structures thereto, hereinafter erected within territorial limits of the governmental authority exercising jurisdiction, and all such buildings and structures moved into or within that jurisdiction.

Any and all additions, alterations and repairs to, and changes of use or occupancy of all buildings and structures within the jurisdiction shall comply with the provisions of this code.

Where, in any specific case, different sections of this Code specify different materials, methods of construction or other requirements, the most restrictive shall govern.

Whenever in this code reference is made to the Appendix, the provisions in the Appendix shall not apply unless specifically adopted.

101.04—Effective

This Code shall become effective as of the date of adoption by the governmental authority exercising jurisdiction.

No provision of this code shall be held to deprive any governmental authority, or department thereof having jurisdiction, of any power or authority it held on the effective date of the adoption of this code or of any remedy then existing for the enforcement of its orders, nor shall it deprive any individual or corporation of its legal rights as provided by law.

101.05—Validity

If any Article, Chapter, section, subsection, paragraph, sentence, clause or phrase of this Code is held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this Code.

The governmental authority exercising jurisdiction, here by declares it would have enacted this Code into law and each article, chapter, section, subsection, paragraph, sentence, clause or phrase thereof, irrespective of the fact any one or more articles, chapters, sections, subsections, paragraphs, sentences or phrases be declared unconstitutional.

CHAPTER 102

ORGANIZATION AND ENFORCEMENT

102.01—Building Department

For the purpose of administration and enforcement of this code there is hereby established the "Building Department" as a subdivision of the Governmental Authority exercising jurisdiction.

102.02—Building Official

The Building Department shall be under the direction of the Building Official as designated by the appointing authority of the Governmental Authority.

102.03—Appointment

The Building Official shall be appointed by the appointing Official of the Governmental Authority in such manner as prescribed by law and subject to such qualifications as may be provided in this code and its adopting ordinance.

102.04—Duties of Building Official

The Building Official is hereby authorized and directed to administer and enforce all regulations and provisions contained in this code and any amendments thereto, within the jurisdiction of the adopting Governmental Authority, and for such purposes the Building Official shall have the powers of a police officer.

102.05—Deputies and Employees

In accordance with procedure of the Governmental Authority and subject to approval of the Chief Appointing Official, the Building Official may appoint such number of Deputies, Assistants, Officers, Inspectors or other Employees as may be authorized and necessary to carry out the functions of the Building Department.

102.06—Chief Deputy

The Building Official, subject to procedure of the Governmental Authority and approval of the Chief Appointing Official, may designate an employee of the Building Department as Chief Deputy and who shall, in the absence or disability of the Building Official, exercise the authority of the Building Official.

102.07—Restrictions on Employees

No Official, Deputy, Assistant, Inspector or Employee of the Building Department shall engage directly or indirectly in any phase of the construction industry or the building professions, or in any type of gainful employment or business that conflicts with official duties or the interests of the Building Department.

102.08—Liability

Any Official or Employee of the Building Department charged with the administration or enforcement of this code and acting for the Governmental Authority in the discharge of such duties, shall not thereby be rendered liable personally, and is hereby relieved of all personal liability for any and all damage that may accrue to persons or property as a result of any act required or permitted under the provisions of this Code, and any suit or legal action brought against any Official or Employee because of any act performed in the administration or enforcement of the provisions of this Code shall be defended by the Legal Department of the Governmental Authority until final termination of the proceedings, and the Governmental Authority shall assume any and all financial liability thereof.

102.09—Records and Reports

The Building Official shall keep, or cause to be kept, a permanent accurate account of all activity of the Building Department, and an account of all fees and other monies collected or received by the department, the names of the persons upon whose account the same were paid, the date and amount thereof, and the location of the building or premises to which they relate, and such records shall be open to public inspection.

Not less than once each year the Building Official shall submit a complete report to the proper Official of the Governmental Authority on the activity of the Building Department during the preceding period, and shall incorporate in said report a summary of recommendations as to desirable amendments or revisions to the law and to this Code.

102.10—Interpretations

Interpretations of the provisions of this code shall be made by the Building Official, and for such purpose and subject to approval of the chief appointing authority the Building Official may employ or subscribe to technical consultant advisory services.

102.11—Rules and Regulations

The Building Official may establish such rules and regulations as deemed necessary to the administration and enforcement of this code, or as an emergency measure and not inconsistent to the provisions of this code or to accepted engineering practice, and such rules and regulations shall be subject to ratification by the Legislative authority of the governmental authority exercising jurisdiction.

102.12—Requirements not Covered by This Code

The Building Official shall determine any requirement not specifically set forth in this code necessary in an emergency or necessary for the strength or stability of an existing or proposed building or structure.

102.13—Valuation

The determination of value or values of buildings or structures under the provisions of this code shall be made by the Building Official.

102.14—Stop Orders

Whenever any building or construction work is being done contrary to the provisions of this Code, the Building Official may order such work stopped by notice in writing served on any person engaged in the doing or causing such work to be done, and such persons shall immediately cease such work until authorized by the Building Official to proceed with the work.

102.15—Revoking of Permit or Approval

The Building Official may revoke a permit or approval issued under the provisions of this Code, in case there has been any false statement or misrepresentation as to a material fact in the application of plans on which the permit or approval was based.

102.16—Right of Entry

The Building Official or authorized representatives of the Building Department, upon presentation of proper credentials, may enter at reasonable times any building, structure or premises within the jurisdiction in the performance of duties imposed by this code.

In event of an emergency or catastrophe the Building Official or authorized representatives of the Building Department, may enter any affected building or structure at any time.

102.17—Emergency Measures

In event of an emergency or catastrophe affecting any building or structure and the safety of the occupants thereof or the public generally, the Building Official may verbally order the immediate evacuation of occupants of all effected buildings or structures or of a specified area and may order streets, alleys and passageways within an effected area closed to all but emergency traffic and may order an immediate disconnection of utility services to the affected area. Failure to comply with such emergency orders shall constitute violation of the provisions of this code.

102.18—Consultants

The Building Official, subject to approval of the proper administrative authority, may employ or engage professional consultants and qualified plan checking services as advisors on involved types of construction or for checking plans under the provisions of this code, except such professional consultants or officers of the plan checking services shall not be or have been engaged in any phase of construction or profes-

sional practice within the jurisdiction of the Governmental Agency for a period of one (1) year, or in the manufacture or distribution of structural materials or products.

CHAPTER 103

OWNERS RESPONSIBILITY

103.01—Registration of Ownership

The owner or designated agent of all existing buildings or structures within the jurisdiction of the Governmental Agency shall, within ninety (90) days of the adoption of this code, file with the Building Official in prescribed form, a Registration of Ownership, setting forth the permanent address of the owner, full name and addresses of any and all owners or partners, the name and address of designated agents, location of building by street address and number, plot or plat number, description of building, its current valuation and its use and occupancy. Upon change of ownership an amended registration shall be filed within ninety (90) days of such change.

An absentee owner, or an owner who is absent from the jurisdiction more than twenty-five (25) per cent of the time shall appoint and designate an agent, who shall be available at all times to accept service of such orders or notices as may be issued by the Building Official.

An application for Registration of Ownership of new buildings shall be filed prior to the issuance of the Certificate of Occupancy and Compliance.

103.02—Other Jurisdictions

It shall be the responsibility of the owner, or his duly authorized agent, to determine such departments and agencies, or other governmental authority as may have jurisdiction and make application to such agencies for necessary approvals or permits.

Note: under certain circumstances and conditions the Fire Department, State Fire Marshal, Departments of Health, Streets, Sewers, Water or Utilities, State Highway Department, State Conservation, State Aeronautics, Civil Aeronautics Administration, the Zoning Board and Planning Commission may exercise authority. Private Utility Companies also often have certain rules and regulations.



CHAPTER 104

BOARD OF ADJUSTMENTS AND APPEALS

104.01 —General

There is hereby established the Board of Adjustments and Appeals as an agency of the governmental authority exercising jurisdiction and for such purpose as contained in this chapter and this code.

104.02 —Purpose

The Board of Adjustments and Appeals shall upon petition of an appellant, and after a public hearing, render decisions on appeals for relief of orders of the Building Official, or upon refusal of the Building Official to issue a permit or approve a material or type of construction not specifically provided for in this code, or upon appeal for variance to or modification of provisions of this code.

The Board shall also hear appeals of applicants for licenses rejected by any of the Examining Boards under this code.

104.03 —Membership of the Board

Membership of the Board of Adjustments and Appeals shall consist of five (5) members, one (1) shall be a registered architect, one (1) a registered structural engineer, one (1) a general contractor of not less than ten (10) years experience, and two (2) representatives of the general public and not connected with the building industry. Alternates shall be appointed for each principal membership. The Building Official shall be an ex-officio member of the Board and shall serve as Secretary of the Board.

104.04 —Appointment and Terms

Members of the Board of Adjustments and Appeals, and their alternates, shall be named by the appointing authority of the governmental authority exercising jurisdiction for a term of three (3) years, except, as first appointed the term of two (2) members shall be for three (3) years, two (2) for two (2) years and one (1) for one (1) year, and alternates shall be appointed in the same manner and for the same terms as the principals. Vacancies shall be filled for the unexpired terms in the manner in which the original appointments are required to be made. Continued absence of any member from regular meetings shall, at the discretion of the appointing authority, render such member liable for removal from the Board. The appointing authority shall designate a Chairman of the Board from among the members of the Board for a term of one (1) year.

104.05—Manner of Acting

The Board shall establish rules and regulations for its own procedures not inconsistent with the provision of this code

and shall meet at regular intervals as determined by the Chairman, and/or within fifteen (15) days after notice that a petition of appeal has been received. Meetings of the Board shall be open to the public and notice of such meetings specifying the items to be under consideration shall be publicly posted in the office of the Building Official ten (10) days prior to such meeting.

104.06 —Quorum

Three (3) members of the Board, or two (2) members and three (3) alternates, shall constitute a quorum and a majority vote of a quorum meeting shall constitute an act of the Board. No member of the Board or an alternate shall act in instances where personal interest is involved, and with a member so disqualified or absent, an alternate shall serve.

104.07 —Records

The secretary of the Board shall make and retain an accurate and detailed record of the proceeding of all meetings of the Board, and which shall set forth all decisions, the reason for same, the vote of each member participating therein, the absence of any member and the failure of any member to vote.

104.08 —Petition of Appeal

Petition of Appeal to the Board of Adjustments and Appeals may be filed by the owner of a building or property or by the duly authorized agent of the owner, or by the applicant for license that has been rejected, and shall be in prescribed form as furnished by the Building Official and shall be filed within the specified time limit.

Construction work interpreted by the Building Official as in violation of the provisions of this code shall not be continued during the period a Petition of Appeal is pending.

104.081—Time Limit for Filing

Petition of Appeal on refusal of the Building Official to issue a building permit, or approve the use of a specified material or type of construction, or to grant a variance of or modification to provisions of this code, or on a stop order of the Building Official, shall be filed within ninety (90) days of the date such refusal or order.

104.082—Stop or Condemnation Order

Petitions of Appeal to an order of the Building Official for immediate repair of a building or structural, and involving the owner in an expense, shall be filed within thirty (30) days of the date of such order, except, on orders involving buildings or structures classified as unsafe or dangerous, the Building Official may in the order limit the time allowed for filing petition of appeal to a lesser period.

104.083—Licenses

Petitions of Appeal of rejection applicants for licenses shall be filed within thirty (30) days of date of notice of such rejection.

104.09 —Variation and Modifications

Upon application and a public hearing the Board of Adjustments and Appeals may vary the application of any provision of this code to any particular case when, in the opinion of the Board, the enforcement thereof would do manifest injustice and would be contrary to the intent and purpose of this code or public interest, or when in the Board's opinion the interpretation of the Building Official should be modified or reversed.

A decision of the Board of Adjustments and Appeals to vary the application of any provision of this code or to modify an order of the Building Official shall specify the manner in which such variation or modification is made, the conditions under which it is made and the reasons thereof, and shall apply only to the specific case under consideration and shall not constitute a revision or modification of the provisions of this code.

104.10 —Decisions

Decisions of the Board of Adjustments and Appeals shall be in writing and shall indicate the vote of the members thereto, and shall be promptly filed in the office of the Building Official open to public inspection with a copy publicly posted for fifteen (15) days after filing. A certified copy shall be sent by mail to, or otherwise served upon the appellant.

The Board in each case shall render a decision without unreasonable or unnecessary delay.

The Building Official shall take immediate action in accordance with any decision rendered by the Board of Adjustments and Appeals.



CHAPTER 105

MATERIALS, APPROVALS AND TESTS

105.01—Alternate Materials and Methods

The provisions of this Code are not intended to prevent the use of any material or method of construction not specifically prescribed by this Code, provided such alternate has been approved.

The Building Official may approve any such alternate, provided the proposed design is satisfactory and the material, method, or work offered is, for the purpose intended, at least the equivalent of that prescribed in this Code in quality, strength, effectiveness, fire resistance, durability and safety.

The Building Official shall require that sufficient evidence or proof be submitted to substantiate claims that may be made regarding the use, merit or worth of a method, product or material, and may refer such method, product or material to the consideration of the Research Committee of the Midwest Conference of Building Officials for examination.

105.02—Tests

Whenever there is insufficient evidence of compliance with the provisions of this Code or evidence that any material or any construction does not conform to the requirements of this Code, or in order to substantiate claims for alternate materials or methods of construction, the Building Official may require tests, as proof of compliance, to be made at the expense of the owner or his agent and by an approved testing agency or laboratory.

Test methods shall be as specified by this Code for the materials in question. If there are no appropriate test methods specified in this Code, the Building Official shall determine the test procedure.

Copies of the results of all such tests shall be retained for a period of not less than two years after the acceptance of the structure.

CHAPTER 106

ALTERED, MOVED AND EXISTING BUILDINGS

106.01—Existing Buildings

Buildings or structures in existence at the time of adoption of this code may have their existing use or occupancy continued, provided such use and occupancy was legal at the time of adoption of this code and does not constitute a hazard to life.

Changes in the use and occupancy of existing buildings or structures shall comply with the provisions of this code for new construction of buildings of like occupancy and areas and heights.

106.02—Moved Buildings

Buildings or structures moved into or within the jurisdiction shall comply with the provisions of this code for construction of new buildings of like occupancy and area and heights.

106.03—Additions, Alterations and Repairs

Buildings or structures to which additions, alterations or repairs are made shall comply with the provisions of this code for the construction of new buildings of like use or occupancy and areas and heights, except as specifically provided in this section.

Additions, alterations or repairs to existing or new buildings or structures, of a total cost within any twelve month period equal to or exceeding the percentage of valuation of the building or structure as provided in this section, shall comply with the provisions of this section and to the provisions of this code for buildings or structures of like use or occupancy and area and heights.

50% or more—The building or structure and additions, alterations and repairs thereto shall conform to the provisions of this code for new construction.

25% and less than 50%—Additions, alterations and repairs shall conform to the provisions of this code for new construction.

Structural, less than 25%—pairs shall conform to the provisions of Structural additions, alterations or rethis code for new construction, except, upon approval of the Building Official minor structural additions, alterations or repairs may be of the same materials of which the building or structure is constructed.

Non-Structural—Non-structural alterations or repairs, less than 25% not effecting any member or portion of

the building or structure having required fire-resistance may be made with the same materials of which the building is constructed, provided such material is not in violation of existing requirements.

106.04—Roof Covering

Roof covering materials and construction shall conform to the provisions of this code for new roof construction.

106.05—Siding

Siding materials and construction shall conform to the provisions of this code for new siding application.

106.06—Maintenance

All buildings or structures, and all parts thereof, shall be maintained in a safe and sanitary condition and all devices and safeguards required by this code in a building or structure when erected, altered or repaired shall be maintained in good working order and the owner, or designated agent, shall be held responsible for such maintenance.

CHAPTER 107 UNSAFE BUILDINGS

107.01—Unsafe Buildings

All buildings or structures which are structurally unsafe or not provided with adequate egress, or which constitute a hazard, or are otherwise dangerous to human life, or which in relation to existing use constitute a hazard to safety or health, or public welfare, by reason of inadequate maintenance, dilapidation, obsolescence, or abandonment, as specified in this Code or any other effective ordinance, are for the purpose of this Chapter, unsafe buildings.

All such unsafe buildings are hereby declared to be public nuisances and shall be abated by repair, rehabilitation, demolition, or removal in accordance with the procedure of this Chapter.

107.02—Notice to Owner

The Building Official shall examine or cause to be examined, every building or structure or portion thereof reported as dangerous or damaged and, if such is found to be an unsafe building as defined in this Chapter, the Building Official shall give to the owner of such building or structure written notice stating the defects thereof.

This notice may require the owner or person in charge of the building or premises, within 48 hours, to commence either the required repairs or improvements, or demolition and removal of the building or structure or portions thereof, and all such work shall be completed within ninety (90) days from date of notice, unless otherwise stipulated by the Building Official.

If necessary, such notice shall also require the building structure, or portion thereof, to be vacated forthwith and not reoccupied until the required repairs and improvements are completed, inspected, and approved by the Building Official.

Proper service of such notice shall be by personal service upon the owner of record, or authorized agent, if he shall be found within the jurisdiction limits. If he is not found within the jurisdiction limits such service may be made upon said owner by registered mail; provided, that if such notice is by registered mail, the designated period within which said owner or person in charge is required to comply with the order of the Building Official, shall begin as of the date he received such notice.

107.03—Posting of Signs

The Building Official shall cause to be posted at each entrance to such unsafe building a notice to read: "DO NOT ENTER UNSAFE TO OCCUPY. Building Department, of" Such notice shall remain posted until the required

repairs, demolition, or removal is completed. Such notice shall not be removed without written permission of the Building Official and no person shall enter the building except for the purpose of making the required repairs or demolishing the building.

107.04—Right to Demolish

In case the owner shall fail, neglect, or refuse to comply with the notice to repair, rehabilitate, or to demolish and remove said building or structure or portion thereof, the governing body of the Authority exercising jurisdiction may order the owner of the building prosecuted as a violator of the provisions of this Code, and may order the Building Official to proceed with the work specified in such notice.

107.05—Costs

Costs incurred under Section 106.04 shall be paid from the Treasury of the Governmental Authority exercising jurisdiction, and such costs shall be charged to the owner of the premises involved as a special assessment or lien on the land on which the building or structure is located, and shall be collected in the manner provided by law.

CHAPTER 108

PERMITS AND FEES

108.01—Permits Required

No person, firm or corporation shall erect, construct, enlarge, alter, repair, move, improve, remove, convert or demolish, equip, use, occupy or maintain any building or structure in the city, or cause the same to be done, without first obtaining a separate building permit for each such building or structure from the Building Department.

108.02—Application

To obtain a permit the applicant shall first file an application therefor in writing in such form as prescribed. Each application shall:

- a. Describe the land on which the proposed work is to be done, by lot, block, tract, and house and street address, or similar description that will readily identify and definitely locate the proposed building or work.
- b. Show the use or occupancy of all parts of the building.
- c. Be accompanied by a plot plan of the property showing the overall dimensions of the property, the location of the proposed building or structure in relation to property boundaries and locations of existing buildings or structures.
- d. Be accompanied by two sets of plans and specifications as required in Chapter 108 of this Code.
- e. State the valuation of the proposed work.
- f. Be signed by the applicant, or his authorized agent, who may be required to submit evidence to indicate such authority.
- g. Give such other information as reasonably may be required by the Building Official.
- h. Shall be subject to the prescribed fees.

108.03—Validity

The issuance or granting of a permit or approval of plans and specifications shall not be construed to be a permit for, or an approval of, any violation of provisions of this Code. No permit presuming to give authority to violate or cancel the provisions of this Code shall be valid, except insofar as the work or use which it authorizes is lawful.

The issuance of a permit based upon plans and specifications shall not prevent the Building Official from thereafter requiring the correction of errors in said plans and specifications or from preventing building operations being carried on thereunder when in violation of this Code or of any other ordinance or regulation enacted by the governmental agency.

108.04—Permit on Affidavit

Whenever work to be covered under a permit involves con-

struction of a hazardous or complex nature, the Building Official may require the registered architect or structural engineer certifying the plans and specifications to file a written affidavit that the plans and specifications as certified conform to the provisions of this code, and such architect or engineer shall supervise construction, and upon completion shall file a written affidavit that the construction has been completed in accordance with the certified plans and specifications.

In event such architect or engineer is not available for supervision, the owner may employ instead a competent person or agency whose qualifications are approved by the Building Official.

108.05—Foundation Permits

When application for permit to erect or enlarge a building has been filed, and pending issuance of such permit, the Building Official may, at his discretion, issue a special permit for the foundations of such building. The holder of such a special permit shall proceed at his own risk and without assurance that a permit for the superstructure will be granted.

108.06—Expiration

Every permit issued by the Building Official under the provisions of this Code shall be for a six months' period and shall expire by limitation and become null and void, if the building or work authorized by such permit is suspended or abandoned any time after the work is commenced for a period of ninety (90) days.

Before such work can be recommenced a new permit shall first be obtained, and the fee therefor shall be one-half the amount required for a new permit for such work, provided no changes have been made or will be made in the original plans and specifications for such work; and provided, further, that such suspension or abandonment has not exceeded one year.

108.07—Building Permit Fees

A fee for each building permit shall be paid to the Building Official as set forth in Table No. 108-A.

Table No. 108-A

Building Permit Fees and Plan Checking Fees

Note: Permit fees shall be as provided in the adopting ordinance.

108.08—Plan-Checking Fees

Before plans and specifications are accepted for checking a plan-checking fee in addition to the building permit fee shall be paid to the Building Official. The plan-checking fee shall be one-half the building permit fee.

CHAPTER 109

PLANS AND SPECIFICATIONS

109.01—Plans and Specifications

Each application for a permit shall be accompanied by two sets of plans and specifications.

Exception: Plans and specifications need not be submitted for small and unimportant work when authorized by the Building Official.

109.02—Information on Plans and Specifications

Plans and specifications shall be drawn to scale upon substantial paper or cloth and shall be of sufficient clarity to indicate the nature and extent of the work proposed and show in detail that it will conform to the provisions of this Code and all relevant laws, ordinances, rules and regulations. The first sheet of each set of plans shall give the house and street address of the work and the name and address of the owner and person who prepared them.

In lieu of detailed specifications, the Building Official may approve references on the plans to a specific section or part of this Code or other ordinances or laws.

Computations, stress diagrams, and other data sufficient to show the correctness of the plans shall be submitted when required by the Building Official.

109.03—Drawings Required for Application

- a. Plot Plan showing location of buildings and accessories, existing grades of adjacent property, proposed finished grades relative to street grade, locations of storm and sanitary sewers, water and gas lines, size of side and back yards and front set-back.
- b. Basement, foundation and floor plans, and all exterior elevations.
- c. Sufficient scale details to define the character of the design.
- d. Rough plan for flat roof structures.
- e. All drawings shall be shown at a definite scale as indicated and shall be reproduced at the same scale.
- f. The drawings and plans submitted shall be drawn as the building is proposed to be built.
- g. A schedule of exterior materials, finish and colors must be shown on the drawings submitted.
- h. Plans for remodeling buildings which affect the exterior appearance shall be accompanied by a drawing sufficient to show the existing building or with photographs of the existing building and surroundings.

109.04—Mechanical Drawings

- a. Complete mechanical plans for the installation of heating, cooking, electrical, ventilation and sanitary equipment and piping shall be submitted to the Building

- Official with the application for approval of the design of each specific prefabricated building.
- b. The plans shall include provisions for the installation of piping and accessories for service equipment either in the shop or at the site, the assembly shall be readily accessible for field inspection, and no essential materials required for structural strength shall be impaired nor structural elements be vitiated by the installation.

109.05—Re-Submission of Plans

Any changes proposed during the construction or remodeling involving changes in the exterior appearance, finished grade or orientation must be shown on the revised drawing and re-submitted to the Building Department.

109.06—Certification of Plans and Specifications

All plans, drawings and specifications submitted to the attention of the Building Official shall be properly sealed on each and every sheet or page with seal of a State Registered Architect or Engineer or Architects certified under the National Council of Architectural Registration Board.

In addition, the Building Commissioner may require a report signed and properly sealed by the same said registrants stating that all parts of the building as shown on said plans and specifications are designed to safely carry all loads and to resist stresses recognized as standard for the particular use for which the building is intended, and conforming to the provisions of this Code.

109.07—Retention of Plans

One set of approved plans, specifications and computations shall be retained by the Building Official and upon completion of the work covered therein shall be permanently filed, and one set of approved plans and specifications shall be returned to the applicant, which set shall be kept on such building or work site at all time during which the work authorized thereby is in progress.

Plans submitted for checking, for which no permit is issued, and on which no action is taken by the applicant for ninety (90) days, shall be returned to the last known address of the applicant; to renew action on said plans, a payment of a new plan check fee shall be required.

109.08—Issuance of Permit

The application, plans and specifications filed by an applicant for a permit shall be checked by the Building Official, and such plans may be reviewed by other departments or agencies to check compliance with the laws and ordinances under their jurisdiction. If the Building Official is satisfied that the work described in an application for permit and the plans filed therewith conform to the requirements of this Code and other pertinent laws and ordinances, and that the fee has been paid, he shall issue a permit therefore to the applicant.

CHAPTER 110

INSPECTION

110.01—General

All construction or work for which a permit is required shall be subject to inspection by the Building Official, and certain types of construction shall have continuous inspection by special inspectors.

110.02—Inspection Record Card

Work requiring a building permit shall not be commenced until the permit holder or his agent shall have posted an inspection record card in a conspicuous place on the front premises and in such position as to allow the Building Official conveniently to make the required entries thereon regarding inspection of the work. This card shall be maintained in such position by the permit holder until the Certificate of Occupancy and Compliance has been issued.

110.03—Approvals Required

No work shall be done on any part of the building or structure beyond the point indicated in each successive inspection without first obtaining the written approval of the Building Official. Such written approval shall be given only after an inspection shall have been made of each successive step in the construction as indicated by each of the inspections required in Section 110.04.

There shall be a final inspection and approval on all buildings when completed and ready for occupancy and prior to issuance of Certificate of Occupancy and Compliance.

110.04—Called Inspections

No reinforcing steel or structural framework of any part of any building or structure shall be covered or concealed in any manner whatever without first obtaining the approval of the Building Official.

The Building Official upon notification from the permit holder, or his agent, shall make the following inspections of buildings and shall either approve that portion of the construction as completed or shall notify the permit holder or his agent wherein the same fails to comply with this Code.

- a. **Foundation Inspection:** To be made after trenches are excavated and forms erected and when all materials for the foundation are delivered on the job. Where concrete from a central mixing plant (commonly termed "transit mixed") is to be used, materials need not be on the job.
- b. **Frame Inspection:** To be made after the roof, all framing, fire-blocking and bracing are in place and all pipes, chimneys and vents are complete.

- c. **Lath Inspection:** To be made after all lathing, interior and exterior, is in place and all plastering materials are delivered on the job, but before any plaster is applied.
- d. **Final Inspection:** To be made after building is completed and ready for occupancy.

110.05—Other Inspection

In addition to the called inspections specified above, the Building Official may make any other inspections of any construction work to ascertain compliance with the provisions of this Code and other laws which are enforced by the Building Department.

110.06—Special Inspection

In addition to the inspections to be made, the owner or his agent shall employ a special inspector who shall be present at all times during construction on the following types of work:

- a. **Concrete:** On concrete work when the design is based on a f'm in excess of 2000 pounds.
- b. **Masonry:** On reinforced masonry work when the design is based on a strength of masonry (f'm) in excess of 1000 pounds per square inch. On all other types of masonry work when the design is based on unit stresses in excess of 50 per cent of those allowed.
- c. **Welding:** On all structural welding.
- d. **Reinforced Gypsum:** When cast-in-place reinforced gypsum is being mixed or deposited.
- e. **Special Cases:** On special construction work involving unusual hazards or requiring constant inspection.
Exception: The Building Official may waive the requirement for the employment of a special inspection if he finds that the construction or work is such that no unusual hazard exists.

110.07—Special Inspector

A special inspector shall be a qualified person approved by the Building Official.

The special inspector shall furnish continuous inspection on the construction and work requiring his employment. He shall report to the Building Official in writing, noting all Code violations and other information required.

CHAPTER 111

VIOLATIONS AND PENALTIES

111.01—Violations

It shall be unlawful for any person, firm or corporation to erect, construct, enlarge, alter repair, move, improve, remove, convert or demolish, equip, use, occupy or maintain any building or structure within the jurisdiction or cause the same to be done, contrary to or in violation of any of the provisions of this Code.

111.02—Penalties

Any person, firm or corporation violating any of the provisions of this Code shall be deemed guilty of a misdemeanor, and each such person shall be deemed guilty of a separate offense for each and every day or portion thereof during which violation is continued or permitted.

Any architect, engineer, contractor, subcontractor, foreman, or agent or other person who shall violate or assist in the violation of any of the provisions of this Code or of any order issued thereunder, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than twenty-five dollars (\$25.00) nor more than five hundred dollars (\$500.00) and the costs of prosecution, and shall stand committed until said fine and costs of prosecution be paid, or until otherwise discharged by due process of law.



CHAPTER 112

CERTIFICATE OF OCCUPANCY AND COMPLIANCE

112.01—Use or Occupancy

No new building or structure shall be used or occupied, and no change in occupancy classification of an existing building or structure or portion thereof shall be made until the Building Official has issued a Certificate of Occupancy and Compliance therefor as provided herein.

112.02—Changes in Use

Changes in the character or use of a building or portions and areas thereof, shall not be made except as specified in this Code.

112.03—Certificate Issued

After final inspection when it is found that the building or structure complies with the provisions of this Code, and a request has been made by the permittee or owner, the Building Official shall issue a Certificate of Occupancy and Compliance which shall contain the following:

- a. The use and occupancy for which the certificate is issued.
- b. A statement that the Floor Load signs, as required have been installed.
- c. A statement that the Room Capacity signs, as required have been installed.
- d. A certification that the building or structure complies with the provisions of this Code.

112.04—Temporary Certificate

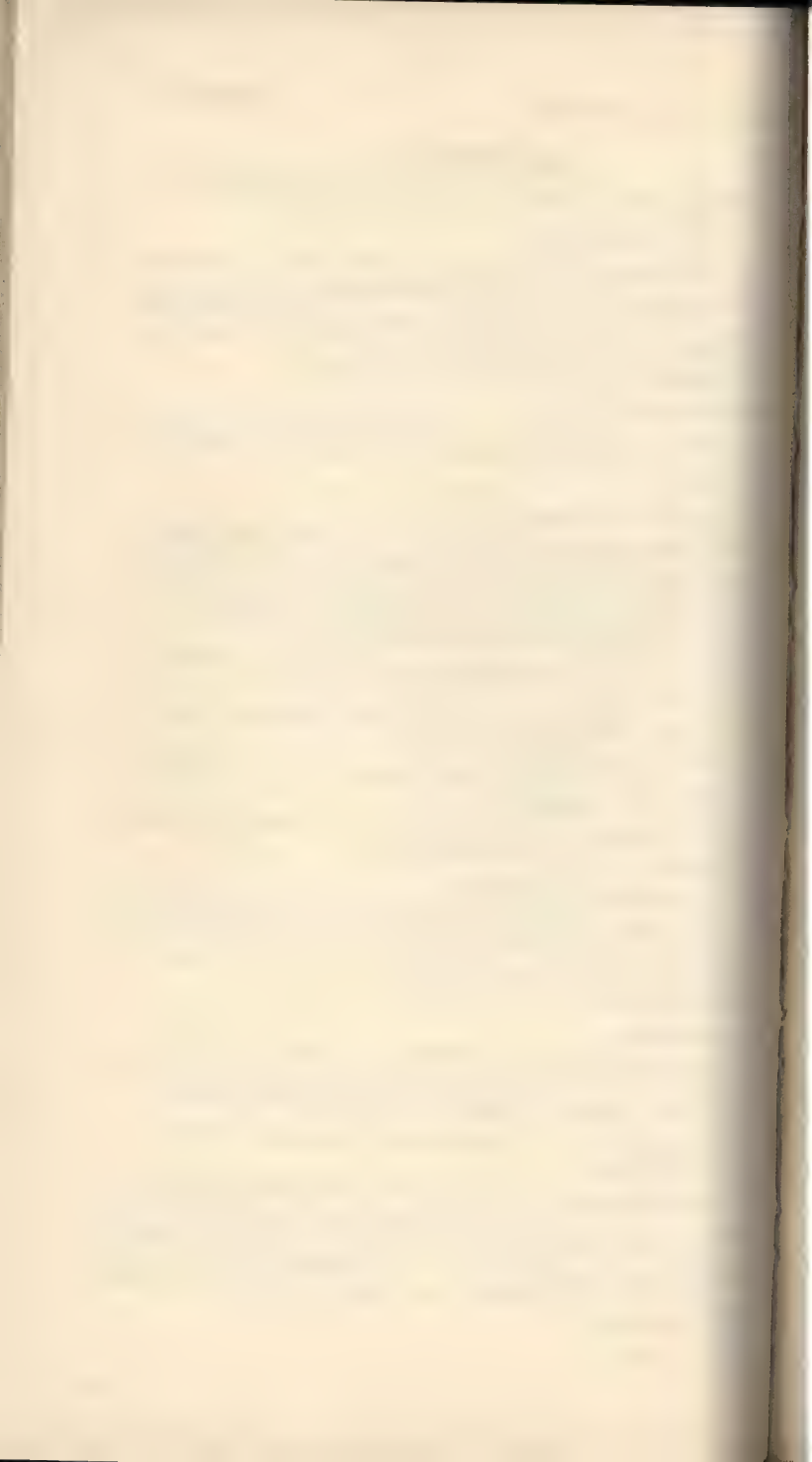
A temporary Certificate of Occupancy and Compliance may be issued by the Building Official for the use of a portion or portions of a building or structure prior to the completion of the entire building or structure.

112.05—Posting

The Certificate of Occupancy and Compliance shall be posted in a conspicuous place in the premises and shall not be removed except by approval of the Building Official.

112.06—Limitations of Certificate of Occupancy and Compliance

The Certificate of Occupancy and Compliance on all buildings, except Group A Occupancies, shall be issued for one (1) year from date only, and shall be subject to renewal annually upon application of the Building Official and reinspection of the Building, and payment of the prescribed reinspection fee.



ARTICLE II

Definitions and Abbreviations

For the purpose of this Code, certain abbreviations, terms, phrases, words and their derivatives shall be construed as set out in this Section. Words used in the singular include the plural and the plural the singular. Words used in the masculine gender include the feminine, and the feminine the masculine.

—A—

Accredited Authoritative Agencies are agencies or organizations establishing accepted standards.

Accepted Engineering Practice is that which conforms to accepted principles, tests or standards of nationally recognized technical or scientific authorities.

Accessory Structure is a building, the use of which is incidental to that of the main building and which is located on the same lot.

Accessory Use is a use incidental to the principal use of a building as defined or limited by the provisions of the local zoning laws.

Addition is an extension or increase in floor area or height of a building or structure.

Adjacent Property Line shall be the dividing line of the lot or property from adjoining property, or of property facing or abutting upon a street, alley or publicways shall be for purpose of exposure distance the center of such street, alley or publicway.

Agricultural Building is a building located on agricultural property and used to shelter farm implements, hay, grain, poultry, livestock, or other farm produce, in which there is no human habitation, and which is not used by the public.

Air Conditioning is the process by which the temperature, humidity, movement and quality of air in buildings and structures are controlled and maintained.

Air Duct is a tube or conduit, or an enclosed space or corridor within a wall or structure used for conveying air.

Air Pollution is the practice of allowing quantities of films, gases, vapors, dust, odors, etc., to escape to the open air in such a manner or quantity as to be detrimental or a nuisance to the public or to damage business or property.

Airplane Hangar (Private) is a hangar for the storage of four (4) or less single motor planes and in which no volatile or flammable oil is handled, stored or kept other than that contained in the fuel storage tank of the plane.

Airplane Hangar (Public) is a hangar for the storage of aircraft.

Article II

Definitions

- Alley** is any public space or thoroughfare not less than ten feet or more than 20 feet in width, which has been dedicated or deeded to public use.
- Alter or Alteration** is any change, addition or modification in construction or occupancy.
- Amusement Device** means a mechanically operated device which is used to convey persons in any direction as a form of amusement.
- Apartment** is a room or suite or rooms which is occupied or which is intended or designed to be occupied by one family for living and sleeping purposes.
- Apartment House** is any building, or portion thereof, which is designed, built, rented, leased, let or hired out to be occupied, or which is occupied as the home or residence of three or more families living independently of each other and doing their own cooking in the said building, and shall include flats and apartments.
- Approval** shall mean that a building or structure constructed under the provisions of this Code, or a material or product used therein, meets the requirements of this Code and has been approved by the Building Official.
- Approved Agency** is an establishment or testing agency recognized and approved by the Midwest Conference of Building Officials to conduct tests on materials and products and issue reports on the results of such tests.
- Approved Material** shall mean any material, product, devise, assembly or mode of construction that has been submitted to investigation of the Research Committee of the Midwest Conference of Building Officials and determined suitable for use under the provisions of this Code.
- Appurtenant Structure** is a device or structure attached to the exterior or erected on the roof of a building designed to support service equipment or used in connection therewith or for advertising or display purposes, or other similar uses.
- Architect** within the meaning of this Code, shall be deemed to be a duly registered and licensed architect.
- Area (Building)** is the maximum horizontal projected area of the building at or above grade, including all enclosed extensions.
- Area (Floor)** is the area included within surrounding walls of a building (or portion thereof), exclusive of vent shaft and courts.
- Areaway** means an uncovered subsurface space adjacent to a building.
- A.S.A.** is the American Standards Association.
- A.S.T.M.** is the American Society for Testing Materials.
- Assembly Building** is a building used, in whole or in part, for the gathering together of persons.
- Attic** is the space between the ceiling beams of the top habitable story and the roof rafters.

Automatic as applied to a fire door or other opening protective, means normally held in open position and automatically closed by a releasing device actuated by abnormal high temperatures, or by a pre-determiner rate of rise in temperature.

—B—

Balcony (Exterior) is an appurtenance to a structure supported on the structure members of the building extending beyond the main wall of the building more than four (4') feet above grade.

Balcony (Interior) is that portion of a seating or assembly space of an assembly room, the lowest part of which is raised four (4') feet or more above the level of the main floor.

Basement is that portion of a building between floor and ceiling, which is partly below and partly above grade but so located that the vertical distance from grade to the floor is less than the vertical distance from grade to ceiling.

Basement Parking Garage is a portion of the basement area of a structure used for the storage of private vehicles.

Bay is the space between two (2) adjacent piers or mullions or between two (2) adjacent lines of columns.

Bay Window is a rectangular, curved or polygonal window, extending beyond the main wall of the building.

Beam is a primary structural member supporting secondary structural members, floor, roof, joists, and the like.

Billboard is a board, panel or tablet used for the display of printed or painted advertising matter.

Brick is a masonry unit having a shape approximately a rectangular prism, usually not larger than 12 inches x 4 inches x 4 inches, made of burned clay or shale, of fire or clay mixtures thereof, or of lime and sand, or cement and suitable aggregates, or of other approved materials.

Building is a combination of materials forming construction that is safe and stable and adapted to permanent or continued occupancy.

Building (Existing) is a building erected prior to the adoption of this Code or one for which a legal building permit has been issued.

Building Line is the line, established by law, beyond which a building shall not extend, except as specifically provided by law.

Building Official is the officer charged with the administration and enforcement of this Code or a regularly authorized deputy.

Building Service Equipment is the mechanical, electrical and elevator equipment, including piping, wiring, fixtures and other accessories, which provide sanitation, lighting, heating, ventilation, fire-fighting and transportation facilities essential for the habitable occupancy of the building or structure for its designated use and occupancy.

Building Site is the area occupied by a building or structure including the yards and courts required for light and ventilation, and such areas that are prescribed for access to the street.

Buttress is a projecting part of a wall built integrally therewith to furnish lateral stability which is supported on proper foundations.

—C—

Cellar is that portion of a building between floor and ceiling which is wholly or partly below grade and so located that the vertical distance from grade to the floor below is equal to or greater than the vertical distance from grade to the ceiling.

Certificate of Use and Occupancy is the certificate issued by the building official which permits the use of a building in accordance with the approved plans and specifications and which certifies compliance with the provisions of law for the use and occupancy of the building in its several parts together with any special stipulations or conditions of the building permit.

Change of Use is an alteration by change of use or occupancy in a building heretofore existing to a new use group which imposes other special provisions of law governing building construction, equipment or exits.

Chief of the Fire Department is the head of the Fire Department or any regularly authorized deputy.

Chimney is a primarily vertical enclosure containing one or more flues.

City is the governmental agency which has adopted this Code.

Combustible Material is an inflammable material which will ignite at or below a temperature of 1200° F. and continue to burn or glow.

Commissary shall be any establishment or concession preparing, serving or selling food products to occupants of buildings or employees of commercial or industrial enterprises for consumption upon the premises.

Common-Property Line is a line dividing one lot from another when said lots are not of one ownership.

Construction Operation is the erection, alteration, repair, renovation, demolition or removal of any building or structure; and the excavation, filling, grading and regulation of lots in connection therewith.

Controlled Materials are products or materials which are certified by an accredited authoritative agency as meeting accepted engineering standards for quality.

Corridor is an enclosed passageway leading to a means of legal egress.

Court is an open, unoccupied space, bound on two or more sides by walls of the building. An inner court is a court entirely within the exterior walls of a building. All other courts are outer courts.

Curb Level is the elevation of a street curb as established in accordance with the law.

—D—

Dead Load in a building is the weight of the walls, permanent partitions, framing, floors, roofs and all other permanent, stationary construction forming a part of the building.

Dumb-Waiter is a hoisting or lowering mechanism for moving materials or products in a substantially vertical direction between two or more floors of a building or structure.

Dwelling is a structure occupied exclusively for residential purposes by not more than two family units.

Dwelling Unit is one or more rooms arranged for the use of one or more individuals living together as a single family unit, with cooking, living, sanitary and sleeping facilities.

—E—

Educational Occupancy means the occupancy or use of a building or structure or any portion thereof by persons assembled for the purpose of learning or of receiving educational instruction.

Electrical Service Equipment is the equipment located at a point of entrance of supply conductors to a building which constitutes the main control of supply and means of cut-off of electricity, including circuit breaker, switches, fuses and electrical accessories.

Electrical Code is the code or the regulations enforced by the governmental agency to control the installation and maintenance of electrical equipment in buildings.

Existing Building is a building erected prior to the adoption of this Code or one for which a legal building permit has been issued.

Elevator is a hoisting and lowering mechanism equipped with a car or platform which moves in guides in a substantially vertical direction and which serves two or more floors of a building or structure.

Engineer, within the meaning of this Code, shall be deemed to be a duly registered and licensed structural engineer.

Escalator is a moving stairway for transporting passengers from one level to another.

Existing is that in existence before the time that this Code became effective.

Exit is a continuous and unobstructed means of egress to a public way, and shall include intervening doorways, corridors, ramps, stairways, smokeproof enclosures, horizontal exits, exterior courts, and yards.

Exposure or Exposure Distance shall be the distance of an exterior wall from the adjacent property line.

—F—

- Family** is one or more persons related by blood or marriage or not more than three persons not related by blood or marriage, living together as a single housekeeping unit.
- Filling Station** includes buildings on lots used for the purpose of supplying motor fuel to tanks of motor vehicles for immediate use.
- Fire Area** is the floor area enclosed and bounded by fire walls or exterior walls of a building to restrict the spread of fire.
- Fire Damper** is an approved automatic or self-enclosing non-combustible barrier designed to prevent the passage of air, gasses, smoke, or fire through an opening, a duct or plenum chamber.
- Fire District** is the territory defined and limited under the legal procedure of the governmental agency for creating and establishing fire districts.
- Fire Division** is the interior means of separation of one part of a floor area from another part together with fire-resistive floor construction, to form a complete fire barrier between adjoining or superimposed floor areas in the same building or structure.
- Fire Door** is a door and its assembly so constructed and assembled in place as to give the specified protection against the passage of fire.
- Fire Partition** is a partition of construction which subdivides a building to restrict the spread of fire or to provide areas of refuge.
- Fire Protection** is the provision of safeguards in construction and of exit facilities; and the installation of fire alarm, fire detecting and fire extinguishing service equipment to reduce the fire risk and the conflagration hazard.
- Fire Retardant Lumber** is lumber treated by pressure impregnation to reduce combustibility.
- Fire-Resistance or Fire-Resistive Construction** is construction to resist the spread of fire.
- Fire-Resistance Rating** is the time in hours that the material or construction will withstand the standard fire exposure as determined by a fire test made in conformity with the "Standard Methods of Fire Tests of Building Construction and Materials" of the American Society for Testing Materials (ASTM Designation E119-50).
- Fire Retardant Ceiling** is a ceiling used in a floor and ceiling construction that has a fire resistance rating of one hour or more.
- Fire Retardant Materials** are materials used in structures for fire resistive rating of not less than one hour.
- Fire Valve** is an automatic self opening non-combustible device designed to permit the passage of gases, smoke or fire through an opening or vented area.

Fire Retardant Materials are materials used in structures for which fire retardant ratings have been developed.

Fire Window is a window and its assembly so constructed and assembled in place as to give protection against exposure fires.

Floor Area is the area included within surrounding walls of a building (or portion thereof), exclusive of vent shafts and courts.

Front of Lot is the front boundry line of a lot bordering on the street, and in the case of a corner lot may be either frontage.

—G—

Gallery is that portion of the seating space of an assembly room having a seating capacity of more than ten (10) located above the balcony.

Garage is a building or portion thereof in which a motor vehicle containing gasoline, distillate or other volatile, flammable liquid in its tank, is stored, repaired or kept.

Garage (Public) is any garage other than a private garage.

Governmental Authority is a city, municipality, village, town township, county, state or federal governmental agency or subdivision thereof, exercising legal jurisdiction in the enactment, administration and enforcement of codes, rules, regulations, laws or ordinances.

Grade (Ground Level) is the average of the finished ground level at the center of all walls of a building. In case walls are parallel to and within five feet (5') of a sidewalk, the above ground level shall be measured at the sidewalk.

Grade (Lumber) is the division of sawed lumber into quality classes with respect to its physical and mechanical properties as defined in published lumber manufacturers' standard grading rules.

Guest is any person hiring or occupying a room for living or sleeping purposes.

—H—

Height of Building is the vertical distance from the "grade" to the highest point of the coping of a flat roof or to the deck line of a mansard roof or to the average height of the highest gable of a pitch or hip roof.

Horizontal Separation means a permanent open space between the building wall under consideration and the nearest line to which a building is or may be legally built. One-half of the street width shall be used in determining the distance of horizontal separation for walls facing on a street and one-half of the narrowest space between two buildings on the same lot shall be used in determining the distance of horizontal separation between walls of buildings on the same lot.

Hotel is any building containing six or more rooms intended or designed to be used, or which are used, rented or hired out to be occupied, or which are occupied for sleeping purposes of guests.

—I—

Incombustible Material is any material which will not ignite at or below a temperature of 1000° Fahrenheit during an exposure of five minutes and which shall not continue to burn or glow at that temperature.

Inner Court is an unoccupied space bounded by the walls of the building, but located within the exterior walls of the building.

Interior Lot Line is any lot line other than one adjoining a street or public space.

—L—

Intel is the beam or girder placed over an opening in a wall, which supports the wall structure above.

Live Loads are all imposed, fixed or transient loads other than "dead loads."

Load (Dead) means the weight of all permanent construction including walls, floors, roofs, partitions, stairways and of fixed service equipment.

Lobby is the enclosed vestibule between the principle entrance to a building and the doors to the main floor of the auditorium or assembly room of a theatre or place of assembly, or to the main floor corridor of a business building.

Lot means a portion or parcel of land considered as a unit.

Lot (Corner) is one with two (2) adjacent sides abutting upon streets or other public spaces.

Lot (Interior) is one which faces on one street or with opposite sides on two (2) streets.

Lot Line means a line dividing one lot from another, or from a street or other public space.

—M—

Marquee is a permanent roofed structure attached to and supported by the building.

Masonry is that form of construction, composed of stone, brick, concrete, gypsum, hollow clay tile, concrete block or tile, or other similar building units or materials or a combination of these materials laid up unit by unit and set in mortar. For the purpose of these rules and regulations, plain monolithic concrete shall be considered as masonry.

Masonry (Hollow Units) means a masonry unit whose net cross-sectional area in any plane parallel to the bearing surface is less than 75 per cent of its gross cross-sectional area measured in the same plane.

Masonry (Solid) is masonry built without hollow spaces.

Solid Masonry Unit means a masonry unit whose net cross-sectional area in every plane parallel to the bearing surface is 75 per cent or more of its gross cross-sectional area measured in the same plane.

Mezzanine or Mezzanine Floor is an intermediate floor placed in any story or room. When the total area of any such "mezzanine floor" exceeds 33½ per cent of the total floor area

in that room, it shall be considered as constituting an additional "story." The clear height above or below a "mezzanine floor" construction shall not be less than seven (7) feet.

Municipality when used is the governmental authority which has adopted this Code under due legislative authority .

Multi-Family House means a building or portion thereof containing three or more dwelling units; including tenement house, apartment house or flat.

Multiple Dwelling has the same meaning as Apartment House.

—N—

NP as used in this Code is an abbreviation of 'Not Permitted!'

Noncombustible as applied to a building construction material, means a material in the form in which it is used falls in one of the following groups. (a through c). It does not apply to surface finish materials nor to the determination of whether a material is non-combustible from the standpoint of clearances to heating appliances, fires, or other sources of high temperature. No material shall be classed as noncombustible which is subject to increase in combustibility or flame spread rating beyond the limits herein established, through the effects of age, moisture or other atmospheric condition. Flame spread rating as used herein refers to ratings obtained according to the Standard Test Method for Fire Hazard Classification of Building Materials of Underwriters' Laboratories, Inc (ASTM E84).

(a) Materials, no part of which will ignite and burn when subjected to fire. Any material which liberates flammable gas when heated to a temperature of 1,380° F., for five minutes shall not be considered noncombustible within the meaning of this paragraph.

(b) Materials having a structural base of noncombustible material, as defined in (a), with a surfacing not over 1/8-inch thick which has a flame spread rating not higher than 50.

(c) Materials, other than as described in (a) or (b), having a surface flame spread rating not higher than 25 without evidence of continued progressive combustion and of such composition that surfaces that would be exposed by cutting through the material in any way would not have a flame spread rating higher than 25 without evidence of continued progressive combustion.

Noncombustible Construction includes protected noncombustible construction and unprotected noncombustible construction.

—O—

Occupancy is the purpose for which a building is used or intended to be used. Change of occupancy is not intended to include change of tenants or proprietors.

Occupancy Load is the number of individuals normally occupying the building or part thereof, for which the existing facilities have been designed.

Occupied, as applied to a building, shall be construed as though followed by the words "or intended, arranged or designed to be occupied."

Oriel Window is a window which projects from the main line of an enclosing wall of a building and is carried on brackets or corbels.

Owner includes his duly authorized agent or attorney, a purchaser, devisee, fiduciary, and a person having a vested or contingent interest in the property in question.

—P—

Panel (Part of a structure) is the section of a floor or wall comprised between the supporting frame of two (2) adjacent rows of columns and girders or column bands of floor construction.

Passageway means an enclosed hallway or corridor connecting a required exit to a street.

Penthouse means an enclosed structure other than a roof structure, located on the roof, extending not more than twelve (12') feet above a roof.

Person is a natural person, his heirs, executors, administrators or assigns, and also includes a firm, partnership or corporation, its or their successors or assigns, or the agent of any of the aforesaid.

Place of Assembly is a room or space accommodating one hundred (100) or more individuals for religious, recreational, educational, political, social or amusement purposes or for the consumption of food and drink, including all connected rooms or spaces with a common means of entrance and exit.

Place of Outdoor Assembly means the premises used or intended to be used for public gatherings of two hundred (200) or more individuals in other than buildings.

Plastic means a material that contains as an essential ingredient an organic substance of large molecular weight, is solid in its finished state, and which at some stage in its manufacture or processing into finished articles, can be shaped by flow.

Platform (Enclosed) is a partially enclosed portion of an assembly room, the ceiling of which is not more than five (5') feet above the proscenium opening and which is designed or used for the presentation of plays, demonstrations, or other entertainment wherein scenery, drops, decorations, or other effects are to be installed or used.

Porch is a roofed structure projecting from a building and separated from the building by the walls thereof.

Porch (Enclosed) is a porch in which not less than fifty per cent of the horizontal section of the exterior walls are enclosed with glass.

Porch (Open) is a porch which has no enclosing features, except screen, roof and roof supports, higher than forty-two (42") inches above the floor level.

Posted Sign is a tablet, card, or plate which defines the use, occupancy, fire grading and floor loads of each story, floor loads of each story, floor or parts thereof for which the building or part thereof has been approved.

Posted Use and Occupancy is the posted classification of a building in respect to use, fire grading, floor load and occupancy load.

Prefabricated means fabricated prior to erection or installation on a building or structure foundation.

Professional Engineer or Architect is an individual technically and legally qualified to practice the profession of engineering or architecture.

Protected Construction, is that in which all structural members are constructed, chemically treated, covered or protected so that the individual unit or the combined assemblage of all such units has the required fire-resistance rating specified for its particular use or application.

Public Corridor is an enclosed public passageway with access to and from individual apartments, offices or rooms leading to a public hallway or to the exitways.

Public Hallways are public corridors or spaces separately enclosed which provide common access to all the exitways of the building in any story.

Public Space is a plot or area of land outside of the building dedicated or devoted to public use by legal mapping or by any other lawful procedure.

—R—

Repair is the reconstruction or renewal of any part of an existing building for the purpose of its maintenance. The word "repair" or "repairs" shall not apply to any change of construction.

Required means required by some provision of this Code.

Roof means the roof slab or deck with its supporting members, not including vertical supports.

Roof Structure means a structure above the roof of any part of a building enclosing a stairway, tank, elevator machinery or service equipment, or such part of a shaft as extends above the roof; and not housing living or recreational accommodations.

Roof Covering is the covering applied to the roof for weather resistance, fire-resistance, or appearance.

—S—

Seating Capacity shall be the number of seats permitted in any area or occupancy of assembly as based upon floor areas.

Shaft is a vertical opening through a building for elevators, dumb-waiters, light, ventilation or similar purposes.

Shall as used in this Code is mandatory.

Sprinkled means equipped with an approved automatic sprinkler system properly maintained.

Stage is a partially enclosed portion of an assembly building which is designed or used for the presentation of plays, demonstrations, or other entertainment wherein scenery, drops or other effects may be installed or used, and where the distance between the top of the proscenium opening and the ceiling above the stage is more than five (5') feet.

Stairway is two or more risers.

Standard Fire Test means the fire test formulated under the procedure of the American Standards Association as "American Standard." This "American Standard" is the "Standard Methods of Fire Tests of Building Construction and Materials" of the American Society for Testing Materials.

Story is that portion of a building included between the upper surface of any floor and the upper surface of the floor next above, except that the topmost story shall be that portion of a building included between the upper surface of the topmost floor and the ceiling or roof above. If the finished floor level directly above a basement or cellar is more than six feet (6') above grade such basement or cellar shall be considered a story.

Street is any thoroughfare or public park not less than sixteen (16') feet in width which has been dedicated or deeded to the public for public use.

Street Line means a lot line dividing a lot from a street.

Structure is that which is built or constructed, an edifice or building of any kind, or any piece of work artificially built up or composed of parts joined together in some definite manner.

Surveyor within the meaning of this Code, shall be deemed to be a duly registered and licensed surveyor or civil engineer.

—T—

Theatre is a building or part thereof which contains an assembly hall, having a stage which may be equipped with curtains and permanent stage scenery or mechanical equipment adaptable to the showing of plays, operas, motion pictures, performances, spectacles and similar forms of entertainment.

—U—

UL as used in this Code is an abbreviation of 'Unlimited.'

Use Group means the classification of a building or structure based on the purpose for which it is used.

—V—

Value or Valuation of a building shall be the estimated cost to replace the building in kind.

Veneer is a facing of brick, stone, glass, concrete, tile or similar material attached to a wall for the purpose of providing ornamentation, protection or insulation but not counted as adding strength to the wall.

—W—

Walls Shall Be Defined as follows:

Apron Wall is a wall which supports any vertical load in addition to its own weight.

Bearing Wall is a wall which supports any load other than its own weight.

Cavity Wall means a wall built of masonry units or of plain concrete, or a combination of these materials, so arranged as to provide an air space within the wall, and in which the inner and outer parts of the wall are tied together with metal ties.

Curtain Wall is a non-bearing wall in skeleton construction, anchored to columns, piers or floors, but not necessarily built between columns or piers.

Division Wall is a wall used to divide the floor area of a building or structure into separate parts for fire protection, for different uses, for restricted occupancy, or other purposes specified in this Code.

Exterior Wall means a wall, bearing or non-bearing, which is used as an enclosing wall for a building, but which is not necessarily suitable for use as a Party Wall or Fire Wall.

Faced Wall is a wall in which the masonry facing and backing are so bonded as to exert a common action under load.

Fire Wall means a wall of incombustible construction which subdivides a building or separates buildings to restrict the spread of fire and which starts at the foundation and extends continuously through all stories to and above the roof, except where the roof is of fireproof or fire-resistive construction and the wall is carried up tightly against the under side of the roof slab.

Foundation Wall means a wall below the first floor extending below the adjacent ground level and serving as support for a wall, pier, column or other structural part of a building.

Hollow Wall of Masonry means a wall built of masonry units so arranged as to provide an air space within the wall, and in which the inner and outer parts of the wall are bonded together with masonry units or steel.

Interior Wall is a wall entirely surrounded by the exterior walls of the building.

Non-Bearing Wall is a wall which supports no load other than its own weight.

Panel Wall is a non-bearing wall in skeleton construction built between columns or piers and wholly supported at each story.

Parapet Wall is that part of any wall entirely above the roof line.

Party Wall is a wall used to or adapted for joint service between two buildings.

Retaining Wall is any wall used to resist the lateral displacement of any material.

Spandrel Wall is that portion of a skeleton wall above the head of a window or door.

Veneered Wall means a wall having a facing of masonry or other material securely attached to the backing, but not bonded so as to exert a common reaction under load.

Working Stage is a portion of an assembly building which is cut off from the audience section by a proscenium wall, provided with an opening, so arranged that curtains or drops may be lifted more than ten feet (10') or so that their lower edges are higher than one-half of the height of the proscenium opening.

Writing includes printing and typewriting.

Written Notice shall be any notice delivered or served in writing, either in person to the individual or to the parties intended, or forwarded by registered mail to the last known address of the party to be served.

—Y—

Yard is an open unoccupied space, other than a court, unobstructed from the ground to the sky, except where specifically provided by this Code on the lot on which a building is situated.

—Z—

Zoning is the reservation of certain specified areas within a community or city for building and structures, or use of land for certain purposes with other limitations such as height, lot coverage and other stipulated requirements.

ARTICLE III

General Requirements within Fire District

CHAPTER 301 FIRE DISTRICT

301.01—Fire Zones Defined

For the purpose of administering this Code, certain areas under the jurisdiction of the Governmental Agency exercising jurisdiction are hereby declared to be and are established as a fire district, and said fire district shall be known and designated as Fire Zone No. 1 and No. 2 and shall include such area, territory or portions of said area as outlined in an ordinance of said Governmental Agency entitled "An Ordinance Creating and Establishing Fire District." Whenever, in such ordinances, reference is made to any fire zone, it shall be construed to mean one of the two fire zones designated and referred to in this chapter.

Note: The fire district should include all closely built districts of predominantly business, industry or commercial occupancy, together with such blocks or portions of blocks surrounding these districts on all sides as constitute an exposure to these districts, including areas where a definite trend toward business, industry or commercial development is manifested. The outer belt of blocks or part blocks surrounding the closely built districts ordinarily should be not less than two hundred (200') feet wide.

301.02—Fire Zone No. 1

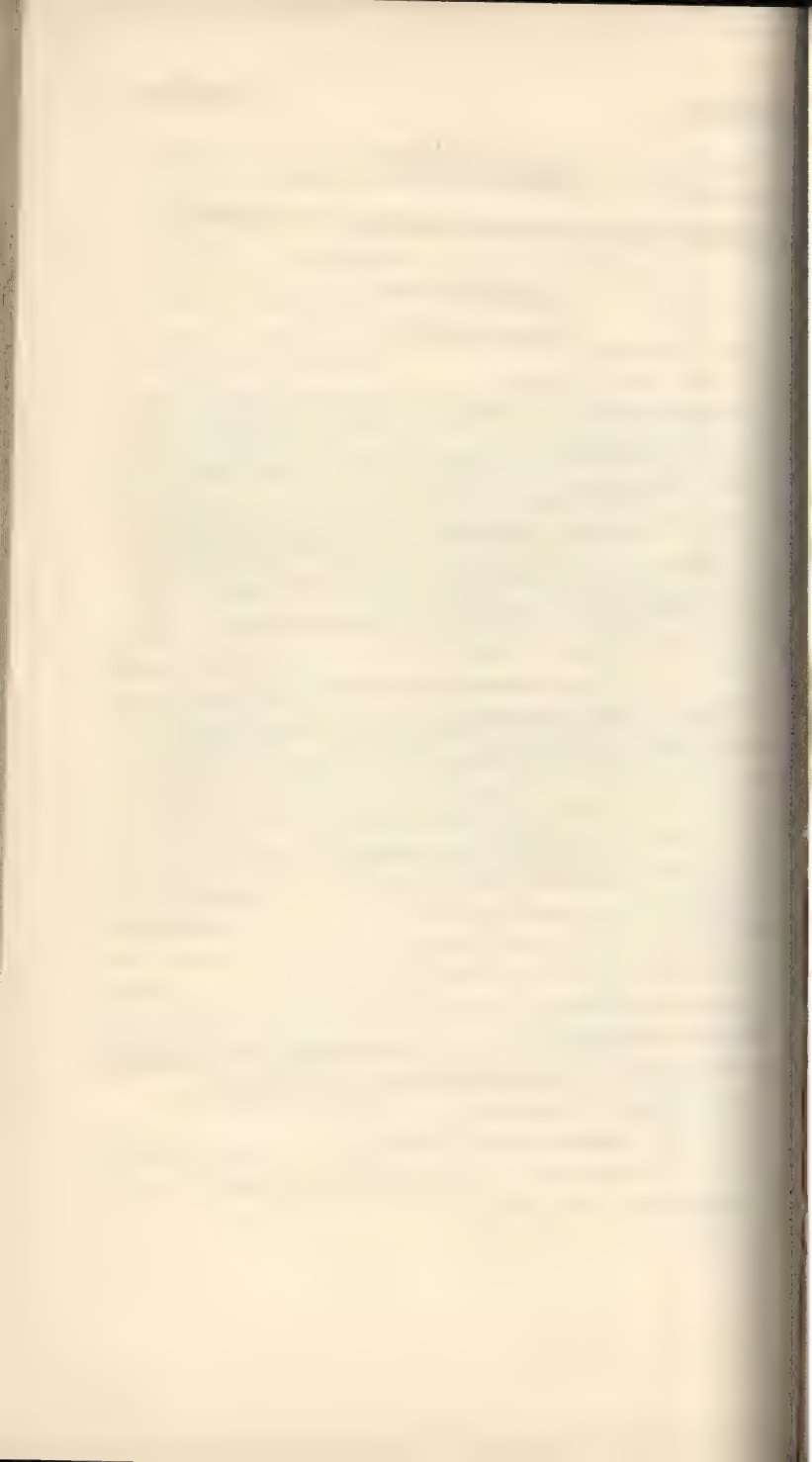
Fire Zone No. 1 shall comprise the areas housing highly congested business or commercial uses or in which such uses are developing.

301.03—Fire Zone No. 2

Fire Zone No. 2 shall comprise the areas housing manufacturing and industrial retail stores, businesses and amusement centers, or in which such uses are developing.

301.04—Area Outside of Fire District

Areas not included in Fire Zone No. 1 and No. 2 may be referred to in this Code as Outside Fire District.



CHAPTER 302**GENERAL REQUIREMENTS AND RESTRICTIONS****302.01—Types of Construction Permitted**

Within the fire district all buildings hereinafter erected shall be of the following types of construction, except temporary structures as provided in this Chapter, and one- and two-family dwellings which may be erected of Type V, wood frame construction within Fire Zone No. 2 only:

Type I—Fire-resistive

Type II—Heavy Timber

Type III—Ordinary Masonry

Type IV—Light Incombustible Frame

302.02—Buildings Located in more than one Fire Zone

A building or structure which is located partly in one fire zone and partly in another shall be considered to be in the more highly restricted fire zone when more than one-third ($\frac{1}{3}$) of its total floor area is located in such zone.

302.03—Moved Buildings

Any building or structure moved within or into any fire zone shall be made to comply with all the requirements for new buildings in that fire zone.

302.04—Temporary Buildings

Temporary buildings such as reviewing stands and other miscellaneous structures conforming to the requirements of this Code, and sheds, canopies or fences used for the protection of the public around and in conjunction with construction work may be erected in Fire Zone No. 1 and Fire Zone No. 2 by special permit from the Building Official for a limited period of time, provided such permit does not violate other existing regulations, and such building or structure shall be completely removed upon the expiration of the time limit stated in such permit.

302.05—Outside Fire Zone

Any building or structure complying with the requirements of this Code may be erected, constructed or moved within or into the area outside of the fire district.

302.06—Restrictions of Types of Construction

Restrictions of Types of Construction and limitations of areas and heights of buildings or structures located within the Fire District or within Fire Zones No. 1 or No. 2, shall be as provided in this Code and for Types of Construction and Occupancy.

302.07—Restrictions of Occupancy Use

Restrictions or limitation of occupancy uses of buildings

or structures located within the Fire District shall be as provided in this Code and for the occupancy use.

Reference: Article IV.

302.08—Existing Buildings

Existing buildings or structures located within Fire Zones No. 1 or No. 2 that do not comply to the provisions of this Code for new buildings within such Fire Zones shall not hereafter be altered, raised, enlarged, added to or moved; except, as provided in this section.

Such buildings may be made to conform to the provisions of this Code for new construction.

Changes, alterations or repairs to the interior of such buildings, or to a front thereof facing upon a street or publicway, may be made, provided, such changes do not in the opinion of the Building Official increase the fire hazard of such building.

Roofs of such buildings shall be covered with a fire-retardant roofing material, as specified in this Code.

Reference: Chapter 807.

Combustible finish on the exterior walls may be replaced with non-combustible materials.

Such buildings may be moved entirely outside the limits of the Fire Zone or the Fire District.

Such buildings may be demolished.

302.09—Parking of Vehicles

Parking of vehicles within ten (10) feet of the exterior walls of any building or structure shall not be permitted within fire districts, except at loading docks or entrances for the purpose of loading or unloading.

302.10—Property Line

For the purpose of this Article, the center line of an adjoining alley may be considered as the adjacent property line. All distances in this Article shall be measured at right angles to the plane of the wall in which the opening occurs.

CHAPTER 303

RESTRICTIONS IN FIRE ZONE NO. 1

303.01—Types of Construction Permitted

Buildings or structures hereafter erected, constructed, moved within or into Fire Zone No. 1 shall be only of Type I, II, III or IV construction and shall meet the requirements of this Chapter.

303.02—Limitations on Type III

Buildings or structures of Type III construction hereafter erected shall have all walls and partitions and floors over usable spaces of not less than one-hour fire-resistive construction.

303.03—Limitations on Type IV

Buildings of Type IV construction erected or moved into Fire Zone No. 1 shall be limited as to occupancy uses, areas and heights as provided in this Code for Types of construction and occupancy uses.

Reference: Articles IV and V.

303.04—Openings

All openings in exterior walls within twenty (20') feet of adjacent property lines or other buildings on the same property or within fifty (50') feet of the opposite side of a street or public place or a court of less than twenty (20') feet in least dimension, shall be provided with doors or windows of one-hour fire-resistive construction.

303.05—Alterations

Any building or structure which is enlarged, altered, raised, repaired or built upon to an extent exceeding an expenditure within any five (5) year period of twenty (20) per cent of the assessed valuation of the building or structure, shall be made to comply with all the requirements of a new building or structure erected in Fire Zone No. 1.



CHAPTER 304

RESTRICTIONS IN FIRE ZONE NO. 2

304.01—Types of Construction Permitted

Buildings or structures hereafter erected, constructed, moved within or into Fire Zone No. 2 shall be one of the types of construction as defined in this Code and shall meet the requirements of this Chapter.

304.02—Limitations on Type IV

Buildings or structures of Type IV construction having an area greater than seventy-five hundred (7500) square feet shall not be erected, constructed, moved within or into Fire Zone No. 2 and such buildings over one thousand (1000) square feet in area, erected, constructed, moved within or into Fire Zone No. 2 shall have all exterior walls of not less than one-hour fire-resistive construction; provided, that when such exterior walls are less than three (3') feet from adjacent property lines or less than six (6') feet from buildings on the same property, the exterior walls shall be of not less than four-hour fire-resistive construction.

304.03—Limitations on Type V

Buildings or structures of Type V construction erected, constructed, moved within or into Fire Zone No. 2 shall have all exterior walls of not less than one-hour fire-resistive construction and shall not exceed three thousand (3000) square feet in area; provided, that when such exterior walls are less than three feet (3') from adjacent property lines or less than six (6') feet from buildings on the same property, the exterior walls shall be of not less than four-hour fire-resistive construction. In all cases the roofs of such buildings shall be covered with a "Fire Retardant" roofing.
Reference: Chapter 807.



ARTICLE IV

Occupancy Requirements

CHAPTER 401

GENERAL OCCUPANCY REQUIREMENTS

401.01—Classification of Buildings by Occupancy

Every existing building and buildings or structures and areas or portions thereof, hereafter erected or constructed within the jurisdiction of the governmental agency exercising authority shall, for the purpose of administering this Code, be classified according to use or occupancy as a building of one of the following occupancy groups, and shall be subject to the provisions of this Code, this Chapter and the Chapter herewith specified for such occupancy.

Group A—Dwelling	Chapter 402
Group B—Residential	Chapter 403
Group C—Business	Chapter 404
Group D—Commercial	Chapter 405
Group E—Institutional	Chapter 406
Group F—Institutional (Restrained)	Chapter 407
Group G—Educational	Chapter 408
Group H—Assembly	Chapter 409
Group I—Assembly (Outside)	Chapter 410
Group J—Stages	Chapter 411
Group K—Industrial (Non-Hazardous)	Chapter 412
Group L—Industrial (Hazardous)	Chapter 413
Group M—Accessory	Chapter 414
Group N—Temporary	Chapter 415

Reference: Subsection 401.016

401.011—Mixed Occupancies

Areas or portions of buildings of predominately one occupancy classification used for other purposes or occupancies shall be classified under the occupancy the minor use most nearly resembles and shall be subject to the provisions of this Code regulating such occupancy group and provisions regulating the predominate occupancy group, and in event of conflict the more restrictive shall apply.

401.012—Assembly Occupancy

Areas or portions of buildings or structures used by the public for assembly, meetings, religious services, educational purposes or entertainment of an occupant capacity of more than one hundred (100) or containing a stage as defined herein, shall be subject to the provisions of this Code regulating assembly occupancy.

Reference: Chapter 409.

Seating of areas of assembly shall be as provided in this Code.

Reference: Subsection 409.098.

Stages, enclosed platforms or raised platforms used in connection with areas of assembly shall be constructed as provided in this Code.

Reference: Section 411.

401.013—Existing Occupancies

Buildings in existence at the time of the adoption of this Code may have their existing use or occupancy continued, provided such use or occupancy was legal prior to the adoption of this Code and such continued use or occupancy does not constitute a hazard to life.

401.014—Change in Use or Occupancy

The occupancy use or character of a building shall not be changed to place the building in a different occupancy group unless the building is made to comply with the requirements of this Code for such occupancy group; except, subject to the approval of the Building Official, the building may be occupied for purposes of other occupancy groups less hazardous in character than the existing use.

401.015—Occupancy of Separated Buildings

Areas or portions of buildings completely separated from the remainder of the building by one (1) or more unpierced continuous walls extending from the foundation of the building to and through the roof to afford a four-hour fire-resistive separation may be considered as a separate building.

401.016—Occupancy Classification by Use

Buildings of the following uses and character shall be included in the occupancy group as specified herein and buildings not classified herein shall be classified by the Building Official and included in the occupancy group the use and character most nearly resembles, based on existing or possible life and fire hazard.

Occupancy Classifications

A

Academies			
Less than 75 in a single room without dormitory	G	Aluminum powder manufacturer	L
Accessory Buildings		Ammunition manufacturer	L
Less than 1,000 sq. ft.	M	Amusement Structures	I
Acetylene Gas		Apartments	B
Manufacture	L	Armories	H
Processing	L	Art Galleries	H
Storage	L	Artificial flower manufacturer	L
Agricultural Buildings		Asbestos storage	K
Less than 1,000 sq. ft.	M	Assembly Buildings	H
Aircraft Hangars		Assembly plants	
Repair, painting or overhauling	L	Hazardous	L
Storage only	K	Non-hazardous	K
		Asylums	F
		Auditoriums	H

Occupancy Classifications

Section 401.016

B

Bakeries	
Commercial	L
Retail	C
Bamboo Storage	L
Banks	L
Barber Shops	C
Basket storage	C
Beauty parlors	C
Belting storage	
Canvas	L
Leather	L
Bleachers	I
Boarding houses—	
10 or more occupants	B
Boiler works	L
Book storage	L
Boot storage	L
Bowling alleys	L
Box manufacturer	L
Breweries	K
Broadcasting studios	H
Broom corn storage	L
Burlap bag storage	L
Business buildings	C
Button storage including	
cloth covered, pearl,	
plastics, or bone	L

C

Candles (wax) storage	K
Canneries	K
Canvas Belting storage	L
Cardboard box storage	L
Cardboard storage	L
Carbon dioxide	
Storage	L
Manufacturing	L
Processing	L
Celluloid	
Manufacture	L
Products manufacture	L
Cellulose nitrate plastic	
Manufacture	L
Warehouses	L
Sales Rooms	D
Cereal mills	K
Chalk storage	K
Chapels	H
Chlorine	
Storage	L
Manufacturing	L
Processing	L
Churches	H
Cigarette storage	K
Cigar storage	K
Civil Administration	
activities	D
Clinics	
Out patient	D
Cloth bag storage	L
Clothing storage, woolen	
wearing apparel	L
Club houses	B
Club rooms	H
Coal pockets	K
Cold storage plants	K
Coliseums	H
Colleges	G
Combs (horn), storage	L
Combustible fibers	
Manufacture	L
Processing	L
Combustible goods	
Storage	L
Sales rooms	L
Condensed milk manufacturing	K

Convents—more than 10	B
occupants	
Cordage storage	K
Cotton batting processing	L
Cotton dressmaking	L
Court Rooms	H
Council Chamber	H
Crayon Storage	K
Creameries	K

D

Dance Halls	H
Day nurseries	E
Day care buildings	
Used for school more than	
4 hours per week	G
Department Stores	C
Depots	
Freight	K
Passenger	D
Distilleries	L
Dormitories	
Ten or more occupants	B
Drive-in Theatres	I
Dry cleaning plants	
Using flammable liquids	L
Using non-flammable liquids	K
Dwellings	
One- and two-family	A
Dyeing Plants	
Using flammable liquids	L
Using non-flammable liquids	K

E

Educational occupancy	G
Electric Light Plants	
Sub-stations	K
Electrolytic reducing works	K
Elevators, grain	L
Excelsior, storage	L
Exhibition Rooms	H
Explosives	
Manufacture	L
Storage	L
Sales	L

F

Feather renovating	L
Feed mills	L
Fences	
Over six (6') feet high	M
Filling stations	D
Film (combustible) storage	L
Fire houses	D
Fireworks manufacturer	L
Flour mills	L
Food products	
Storage	K
Handling	K
Foundries	L
Freight depots	K
Fruit ripening processing	L
Fuel storage	L
Furniture	
Storage	L
Manufacturing	L
Sales Room	D
Fur storage	C

G

Garages	
Private—400 sq. ft. or Less	M
Parking	D
Service	L
Storage	D
Body Shops	L

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Occupancy Classifications

Gas	
Acetylene	
Storage	L
Manufacturing	L
Processing	L
Hydrogen	
Storage	L
Manufacturing	L
Processing	L
Illuminating	
Storage	L
Manufacturing	L
Processing	L
Ammonia	
Storage	L
Manufacturing	L
Processing	L
Chlorine	
Storage	L
Manufacturing	L
Phosgene	
Storage	L
Manufacturing	L
Processing	L
Sulphur dioxide	
Storage	L
Manufacturing	L
Processing	L
Carbon dioxide	
Storage	L
Manufacturing	L
Processing	L
Methyl oxide	
Storage	L
Manufacturing	L
Processing	L
Gasoline	
Bulk plants	L
Refiners	L
Filling stations	D
Glass manufacture	K
Glue storage	K
Grain elevators	L
Grandstands	I
Greenhouses	K
Grist mills	L
Gymnasiums	H

H

Hangars	
Aircraft repair	L
Where no repair is done	K
Hemp storage	L
Homes for children, accom-	
modating 10 or more	E
occupants	E
Homes for the aged	B
Homes—multi-family	K
Horn, storage	E
Hospitals	D
Mental Institutions	B
Hotels	F
Houses of correction	L
Hydrogenation processes	L

I

Ice Plants	
Illuminating gas	K
Manufacture	L
Processing	L
Incombustible materials	
Factories	K
Workshops	K
Storage	K
Sales Rooms	D

Industries
Employing solids or sub-
stances which ignite or
produce flammable gases
on contact with water
Infirmarys
Insane Asylums
Ivory Storage

J

Jails
Japanning
Metal
Storage
Jute Storage

K

Kapok storage
Kerosene storage

L

Laboratories
Lacquer Factories
Laundries
Leather belting storage
Leather
Enameling
Storage
Leather tanneries
Excluding enameling or
japanning
Lecture Halls
Libraries
Linoleum storage
Liquefied petroleum gas
Bulk storage plants
Livestock shelter
Lodge halls
Lodging houses
More than 10 occupants
Lubricating oil storage
With a flash point under
200 degrees
Lumber yards

M

Manufacturing
Acetylene gas
Aluminum powder
Ammunition
Artificial flowers
Boxes
Carbon dioxide
Celluloid
Cellulose nitrate plastic
Chlorine
Combustible fibers
Condensed milk
Cotton batting
Explosives
Fireworks
Gases
Acetylene, Hydrogen,
Illuminating, Natural,
Ammonia, Chlorine,
Phosgene, Sulphur Dioxide
Carbon dioxide, Methyl
oxide, and all gases
subject to explosion,
fume or toxic hazards
Glass
Hydrogen gas
Ice

Section 401.016

55

Occupancy Classifications

56

Storage of solids or substances which ignite and produce flammable gases on contact with water	L	Theatres, Drive-in	I
Stores, retail	C	Tobacco storage	K
Straw goods manufacture	L	Towers	M
Sugar pulverizing mills	L		
Sugar storage	L	U	
Sulphur dioxide	L	Undertaking parlors	D
Storage	L	Universities	G
Processing	C	Upholstering shops	L
Supermarkets	C	Upholstering storage	L
Synthetic leather manufacture	L		
		W	
T		Warehouses where highly combustible material is stored	L
Auto storage	K	Warehouses where noncombustible material is stored	K
Canneries	L	Waste paper	
Car processing	L	Sorting	L
Telephone exchanges	D	Shredding	L
Television		Storage	L
Stations	D	Baling	L
Studios	H	Water pumping plants	K
Transmitting station	K	Wax candles, storage	K
Temporary structures	N	Wholesale stores	
Tents and similar structure for out door assembly	N	Combustible	L
Textile mills		Noncombustible	D
Including canvas, cotton, cloth, bagging, burlap, carpets and rags	L	Woodworking establishments	L
Theatres	H	Workshops using material not highly flammable or combustible	K

401.02—Type of Construction

Buildings or structures shall be of Types I, II, III, IV, or V construction as provided in this Code.

Reference: Article V.

Usable space below the first or ground story of buildings other than single-family dwelling, shall have ceilings of not less than one-hour fire-resistive construction.

Stairs, ramps and exitways of buildings other than single-family dwelling, shall be protected on the underside by not less than one-hour fire-resistive construction.

Columns, beams and girders of structural steel, iron or reinforced concrete in buildings of more than eight (8) stories or eighty-five (85) feet in height, except, buildings of Group L Occupancy, shall be protected by not less than three-hour fire-resistive construction, and floors shall be of not less than two-hour fire-resistive construction.

Penthouses or other allowable structures or projections above the roof, subject to area and height limitations, shall not affect allowable heights of buildings and shall be of such type of construction as required for the building on which they are located.

Penthouses or similar roof structures shall not be used for manufacturing, business, commercial, storage or office purposes; except, such structures may be used for processing

of blue prints, photographic prints, scientific observations, summer houses and for residential occupancy of Group B.

Areas used by the public for assembly, entertainment, meeting or dining purposes shall not be located above or below the first story in buildings of Type V construction or below the first basement and above the second story in buildings of Types III or IV construction, or below the first basement and above the third story in buildings of Type II construction.

Areas used as mercantile sales establishments, sales rooms, display areas, shops or stores displaying, stocking or storing merchandise for retail or wholesale sale shall not be located below the first basement and above the second story in buildings of Types III, IV or V construction, or below the second basement and above the third story in buildings of Type II construction, unless such buildings are of one-hour fire-resistive construction throughout.

401.03—Fire District Requirements

Buildings erected or constructed within the Fire District as defined shall be subject to provisions of this Code regulating construction within the Fire District and the provisions of this Article, and in event of conflict the more restrictive shall apply.

Reference: Article III.

401.04—Design and Loading

Buildings or structures and areas or portions thereof of specified occupancy uses shall be designed for unit live loads of pounds per square foot as provided in this Code and this Section, and for specified occupancy use and shall not be less than specified in Table No. 401-A.

Reference: Chapter 601.

Unit live loads of occupancy uses not specified in this Section or in the specified occupancy chapter shall be determined on the basis of occupancies of similar character.

401.041—Movable Partitions

Floors of areas where partitions are subject to be relocated shall be designed to support in addition to specified loads, a uniformly distributed load equal to twenty (20) pounds per square foot.

401.042—Office Floors

Floors of areas used as offices shall be designed to support a load of two thousand (2000) pounds in any two and one-half (2½) foot square area.

401.043—Superimposed and Vehicle Loads

Floors of areas subject to superimposed loads by installation of equipment or machinery, placing, displaying or stor-

Table No. 401-A
Unit Live Loads—General

Occupancy Use	Pounds per sq. ft.
Apartments	40
Armories	150
Assembly-	
Fixed seats	50
Movable seats	100
Auditorium-	
Fixed seats	50
Movable seats	100
Balconies-	
Exterior	100
Interior—no seating	40
—fixed seats	50
—movable seats	100
Bleachers	100
Chapels	100
Cornices	75
Corridors-	
Private	40
Public	100
Dance halls and floors	100
Dining rooms—public	100
Dormitories	50
Drill halls	100
Dwellings	40
Exposition halls	150
Fire escapes	100
Foyers	100
Galleries-	
Fixed seats	50
Movable seats	100
Garages	100
Grand stands	100
Gymnasiums	100
Hospitals-	
Wards	50
Rooms	40
Laboratories and surgical rooms	75
Hotels-	
Guest rooms	40
Corridors—private	40
—public	100
Lobby	100

Table No. 401-A, Cont.

Libraries-	
Reading rooms	60
Stack rooms	125
Loading docks	250
Lobbies	100
Lodges and Clubs-	
Rooms	50
Halls	100
Loft buildings	100
Manufacturing-	
Light	75
Heavy	125
Marquees	60
Offices	50
Open parking decks	75
Passenger terminals	100
Printing plants-	
Press rooms	150
Linotype rooms	100
Composing rooms	100
Public rooms	100
Rest rooms	50
Restaurants	100
Reviewing stands	100
Schools-	
Class rooms	50
Corridors	100
Shipping rooms	150
Sales rooms-	
Automobile	100
Wholesale—light merchandise	75
—heavy merchandise	150
Automobile parts	150
Sidewalks	250
Skating rinks	100
Stadiums	100
Stairways	100
Storage-	
Light	125
Heavy	250
Stores, retail	75

age of material or merchandise, or movement of heavy or loaded vehicles shall be designed to support in all affected areas in addition to specified design loads, one and one-half ($1\frac{1}{2}$) times the concentrated superimposed load, which of vehicles shall be the concentrated load of the heaviest loaded single wheel.

401.044—Allowable Reductions of Loads

Reduction of live loads may be allowed as provided in this Code.

401.045—Dead, Wind and Roof Loads

Dead, wind, roof and miscellaneous loads shall be as provided in this Code.

401.05—Mixed Occupancy

Buildings or structures and areas or portions thereof used for more than one (1) occupancy purpose shall have each area or portion thereof comprising a separate or distinct occupancy separated from any and all other occupancies by an occupancy separation of not less in hours of fire-resistive construction than specified for each occupancy in Table No. 401-B.

Table No. 401-B
Mixed Occupancy Separations

Group	Occupancy	Hours of Separation
A	Dwelling	1
B	Residential	1
C	Business	1
D	Commercial	1
E	Institutional	2
F	Institutional (Restrained)	3
G	Educational	2
H	Assembly-	
	More than 300 occupant load	3
	Less than 300 occupant load	2
I	Assembly (Outdoor)	1
J	Stage	4
K	Industry (Non-hazardous)	2
L	Industry (Hazardous)	4
M	Accessory	1
N	Temporary	x

401.051—Fire Rating of Occupancy Separations

Occupancy separations of specified hours of fire-resistive construction shall be provided between the various occupancy groups as required in this Code.

Occupancy separations need not be of greater fire-resistive construction than the exterior walls of the building in which

the separation is required; unless such exterior walls are less than one-hour fire-resistive construction.

Required occupancy separations shall be of not less than one-hour fire-resistive construction.

Required occupancy separations in buildings of Type V construction may be of one-hour fire-resistive construction.

401.052—Forms of Occupancy Separation

Occupancy separations shall be verticle or horizontal, or both, and when necessary of such other form as may be required to afford complete or required separation between occupancy divisions of a building or structure.

Structural members supporting a horizontal occupancy separation shall be protected by fire-resistive construction equivalent to that of the separation.

401.053—Types of Occupancy Separation

Occupancy separations shall be classed as follows:

Four-hour fire-resistive

Three-hour fire-resistive

Two-hour fire-resistive

One-hour fire-resistive

Four-hour occupancy separations shall be of not less than four-hour fire-resistive construction and shall contain no openings therein.

Three-hour occupancy separations shall be of not less than three-hour fire-resistive construction and allowable openings in walls forming such separations shall be protected on each side by class A fire doors.

Allowable openings in walls forming a three-hour separation shall not exceed a total width of more than twenty-five (25) per cent of the length of such wall in any single story or shall a single opening exceed an area of more than one hundred and twenty (120) square feet.

Openings in floors forming a three-hour separation shall be protected by verticle enclosures extending above and below such openings, and walls of such verticle enclosures shall be of not less than two-hour fire-resistive construction with openings therein protected on one (1) side by a class B fire door.

Two-hour occupancy separations shall be of not less than two-hour fire-resistive construction and openings therein shall be protected by a class B fire door.

One-hour occupancy separations shall be of not less than one-hour fire-resistive construction and openings therein shall be protected by a class C fire door or its equivalent.

Doors protecting openings of occupancy separations shall normally be maintained at a closed position or shall be equipped with an approved self-closing device.

401.054—Hazardous Areas

Kitchens, bakeries or service areas of other than single family units of Groups A or B Occupancies, used for the preparation or processing of foods for sale or consumption on the premises or for shipment or delivery elsewhere, shall be separated from adjoining areas by not less than one-hour fire-resistive construction.

Shipping and receiving rooms or loading docks and platforms shall be separated from adjoining areas by not less than two-hour fire-resistive construction.

Storage and hazardous areas shall be classified under the occupancy group the use most nearly resembles and shall be separated from adjoining areas as required for the specified occupancy.

Areas or rooms containing central heating plants shall be separated from adjoining areas as provided by this Code.

Boiler rooms containing high pressure boilers shall be classified under Group L Occupancy and separated from adjoining areas as provided by this Code.

Reference: Chapter 413.

401.06—Allowable Floor Areas

The allowable floor areas of buildings or structures in square feet per story shall be determined by the character of the occupancy, type of construction, location in fire district, location upon property and exposure distances from other buildings and adjacent property lines, and; except for allowable increases as provided for each distinct occupancy, shall not exceed the areas specified in this section and subsections, and in Table 401-C.

The aggregate areas of allowable penthouses, appurtenant structures and other projections above the roof of a building or structure shall not exceed twenty (20) per cent of the area of the roof.

401.061—Allowable Floor Area Increases

Allowable floor areas as specified in Table No. 401-C may be increased as provided herein and in Table No. 401-D, and when applicable, increases in percentage of area per story as specified for limited heights, one-hour fire-resistive construction, automatic sprinkler system and excess exposure distances may be compounded; except, increases shall not be allowed for one-hour fire-resistive construction or automatic sprinkler systems where required by other provisions of this Code.

Allowable areas as specified may be increased by forty (40) per cent in buildings of not more than three (3) stories in height, or by seventy-five (75) per cent in buildings of not more than two (2) stories in height.

Table No. 401-C
Allowable Floor Area per Story

Group Occupancy	Fire Zone	Type of Construction				
		I	II	III	IV	V
-A- Dwelling	1	UL	UL	600	600	NP
	2	UL	UL	1800	1800	1800
	0	UL	UL	UL	UL	UL
-B- Residential	1	UL	6300	4200	NP	NP
	2	UL	7200	4800	4500	NP
	0	UL	9900	7800	6600	4200
-C- Business	1	UL	7000	4000	1000	NP
	2	UL	8000	4800	4500	NP
	0	UL	9000	6000	6000	4200
-D- Commercial	1	UL	7000	4500	1500	NP
	2	UL	8000	4800	4500	NP
	0	UL	9900	6600	6600	5100
-E- Institutional	1	UL	3000	1800	NP	NP
	2	UL	3500	2000	2700	NP
	0	UL	4200	2500	3000	1500
-F- Institutional- restrained	1	UL	3000	NP	NP	NP
	2	UL	3500	NP	NP	NP
	0	UL	4200	NP	NP	NP
-G- Educational	1	UL	9000	5000	600	NP
	2	UL	10500	6000	4500	NP
	0	UL	12750	7200	7200	6000
-H- Assembly- indoor	1	UL	6300	4300	600	NP
	2	UL	7200	4800	4500	NP
	0	UL	9000	5400	5400	3600
-I- Assembly- Outdoor	1	UL	NP	NP	NP	NP
	2	UL	11000	4500	4500	NP
	0	UL	UL	7200	18000	1800
-J- Stage	1	2400	1200	900	NP	NP
	2	2400	1200	900	900	NP
	0	2400	1200	900	900	NP
-K- Industry- non-hazardous	1	UL	6300	4200	1500	NP
	2	UL	7200	4800	4500	NP
	0	UL	9000	6000	7200	3600
-L- Industry- hazardous	1	NP	NP	NP	NP	NP
	2	9000	5400	3600	4500	NP
	0	UL	6000	4500	5400	NP
-M- Accessory	1	600	600	600	600	NP
	2	600	600	600	600	240
	0	600	600	600	600	600

Allowable areas may be increased in buildings of one-hour fire-resistive construction throughout as provided for each distinct occupancy.

Allowable areas may be increased in buildings equipped with approved automatic sprinkler systems as provided for each distinct occupancy.

401.062—Allowable Increases for Excess Exposure Distances

For the purpose of this subsection exposure distance to adjacent property lines shall be open unoccupied space free of all obstructions above the ground, and permanently maintained as an integral part of the lot on which the building is located; and of buildings bordering or facing upon publicways, streets or alleys, may be the distance to the curb line of the opposite side of such publicway.

The adjacent property line between two (2) or more buildings located on the same lot shall be fifty (50) per cent of the distance between paralleling exterior walls of such buildings.

Subject to limiting heights in stories, an exposure distance from adjacent property lines in excess of the specified minimum extending along two (2) or more exterior walls and not less than the specified percentage of the perimeter of the building or structure shall permit an increase of allowable floor area in square feet per story of a percentage per excess foot of exposure distance not to exceed the maximum increases as specified in Table No. 401-D.

Table No. 401-D
Allowable Area Increases

Exposure Distance			Limiting Height in Stories	Allowable Increase	
Number of Sides	Perimeter of Building	Min. Width in feet		Rate per access foot of width	Maximum increase allowed
2	45%	20	UL	1¼ %	50%
3	65%	20	UL	2½ %	100%
4	100%	20	UL	3½ %	150%
4	100%	20	2	5%	200%

401.07—Limiting Heights

The maximum height and allowable number of stories of buildings or structures shall be determined by the character of the occupancy, type of construction, location in fire district, location upon property and exposure distances from adjacent property lines, and; except, for allowable increases as provided for each distinct occupancy, shall not exceed the heights specified in this section and subsections, and in Table No. 401-E.

Table No. 401-E
Maximum Heights in Stories

Group Occupancy	Fire zone	Type of Construction				
		I	II	III	IV	V
-A- Dwelling	1	UL	3	2	1	NP
	2	UL	3	3	2	2
	0	UL	3	3	3	3
-B- Residential	1	UL	4	3	NP	NP
	2	UL	4	3	2	NP
	0	UL	5	3	2	2
-C- Business	1	UL	4	3	1	NP
	2	UL	4	3	2	NP
	0	UL	5	3	3	2
-D- Commercial	1	UL	3	3	1	NP
	2	UL	4	3	2	NP
	0	UL	5	3	3	2
-E- Institutional	1	UL	2	1	NP	NP
	2	UL	2	1	1	NP
	0	UL	3	2	1	1
-F- Institutional- restrained	1	UL	2	NP	NP	NP
	2	UL	2	NP	NP	NP
	0	UL	3	NP	NP	NP
-G- Educational	1	3	2	2	1	NP
	2	4	3	2	1	NP
	0	5	3	3	2	1
-H- Assembly- indoor	1	UL	2	1	1	NP
	2	UL	2	1	1	NP
	0	UL	2	1	1	1
-I- Assembly- outdoor	1	UL	NP	NP	NP	NP
	2	UL	2	2	2	NP
	0	UL	3	2	3	1
-J- Stage	1	UL	3	2	NP	NP
	2	UL	3	2	2	NP
	0	UL	3	2	2	NP
-K- Industry- non-hazardous	1	UL	4	2	1	NP
	2	UL	4	2	2	NP
	0	UL	5	3	3	2
-L- Industry- hazardous	1	NP	NP	NP	NP	NP
	2	4	2	1	1	NP
	0	UL	2	1	1	NP
-M- Accessory	1	1	1	1	1	NP
	2	1	1	1	1	1
	0	1	1	1	1	1
Maximum overall height in feet		UL	85'	65'	65'	45'

UL—unlimited. NP—not permitted. O—outside fire district.

The maximum height in feet of buildings or structures shall not exceed the allowable number of stories times fifteen (15) feet plus twenty-five (25) feet, or the limits as provided under Types of Construction.

Reference: Article V.

Penthouses, appurtenant structures and other projections above the roof shall not exceed a height of twenty-eight (28) feet above the roof; except, penthouses of habitable occupancies as permitted in this Code, shall not exceed a height of twelve (12) feet above the roof.

Appurtenant roof structures exceeding the limiting heights above the roof specified in this section or exceeding the allowable aggregate floor areas shall be considered a story or stories.

Basements or cellars used or usable for purposes other than heating or non-hazardous storage, or where the ceiling level of the basement or cellar is more than six and one-half (6½) feet above grade, shall be considered a story.

Mezzanine floors or galleries of more than one-third (⅓) the floor area of the total ground or first floor area shall be considered a story.

401.071—Allowable Height Increases

Limiting heights as specified in Table No. 401-E may be increased as provided herein for each distinct occupancy for one-hour fire-resistive construction or installation of approved automatic fire-extinguishing systems; except, increases shall not be allowed for one-hour fire-resistive construction or automatic sprinkler systems where required by other provisions of this Code or where increases in area have been allowed for such construction or equipment.

401.08—Exterior Walls and Protection of Openings

The fire-resistive construction of exterior walls and the protection of openings therein of all buildings or structures shall be determined by location upon property, exposure distance to adjacent property lines, location in fire district, occupancy use and type of construction, and shall conform to provisions of this Code, this section and subsections, and to provisions regulating the occupancy group in which the building is classified.

401.081—Exposure Distances

Buildings shall adjoin a yard, open space, court, public-way or street as provided for each occupancy use, of not less than twenty (20) feet in width along the entire length of not less than one (1) exterior wall, and such exposed exterior wall shall contain the main entrance and exit of the building at grade level, and such yard, open space or court shall have direct access to a publicway or street.

Exposure distance of exterior walls of buildings facing upon a publicway or street may be the distance from such exposed wall to the curb line of the opposite side of the publicway or street.

Exposure distance of exterior walls of building facing upon an alley or public passageway, other than a publicway or street, shall be the distance from such exposed wall to the center of the alley or public passageway.

Exposure distance of exterior walls which form an angle with adjacent property lines shall be the least distance from any portion of the exposed wall to the adjacent property line.

The adjacent property line between two (2) or more buildings or structures located on the same property shall be fifty (50) per cent of the distance between paralleling exterior walls of such buildings.

401.082—Exterior Walls Facing Upon Streets

Exterior walls facing upon a publicway or street of fifty (50) feet or more in width, in buildings or structures of Types II or III construction located in Fire Zone I, may be of incombustible construction.

Exterior walls facing upon a publicway or street thirty (30) feet or more in width, in buildings or structures of Types II or III construction located in Fire Zone II or outside the Fire District, may be of incombustible construction.

Openings in exterior walls facing upon a publicway or street of twenty (20) feet or more in width, in buildings located in Fire Zone I, shall be protected by not less than one-hour fire-resistive construction.

401.083—Non-Bearing Exterior Walls

Non-bearing exterior walls and openings therein, and walls of inner and outer courts, shall be of such construction and fire-resistive protection as provided for Types of Construction.

Reference: Article V.

401.084—Access Panels

Exterior walls of buildings or structures of three (3) or more stories in height facing upon a yard, open space, court, publicway or street, and containing no openings therein, except as provided for specific occupancies, shall be equipped with access panels installed as provided in this Code.

Reference: Subsection 401.146.

401.09—Occupant Capacity and Exitways

The occupant capacity of buildings or structures and areas or portions and specified occupancy uses thereof, and the required capacity, width and number of exitways and units thereof, shall be as provided in this Code, this section and

subsections and corresponding sections of the occupancy chapter under which the building is classified.

Reference: Chapters 402-415.

Interior areas of single-family dwelling or residential units of buildings of Group A and B Occupancies shall be exempt from provisions of this section or subsections.

Reference: Sections 402.09 and 403.09.

Exitways shall include corridors, lobbies, foyers, arcades, aisles, stairs, ramps, landings, doors, vestibules, exits and other areas serving in whole or in part as a required means of exit travel to the exterior of the building, and: except, as provided, exitways shall terminate upon a publicway, public alley or street.

Construction of exitways and corridors, stairs, doors or exits, shall be as provided in this Code and for Types of Construction.

Reference: Chapter 706.

Reference: Article V.

Fire corridors may be permitted as exitways in buildings of specified occupancy uses and of Types I, II or IV construction, and when permitted shall be of such construction and fire-resistance as provided in this Code.

Smoke proof towers where required or used shall be of such construction and fire-resistance as provided in this Code.

Areas or portions of buildings subject to concentrated occupant loads shall be provided with additional exitways based upon the occupant capacity of the concentrated occupant load, and such additional exitways shall not reduce the required number, widths or capacity of required exitways from other areas or portions of the building.

Aisles of areas of assembly of more than one hundred (100) occupant capacity shall be as provided in this Code.

Seating of occupants of areas of assembly of more than one hundred (100) occupant capacity shall be as provided in this Code.

Reference: Subsection 409.098.

Dining rooms, cafeterias, gymnasiums, or other areas of assembly used by the public, of an occupant capacity of more than one hundred (100) and/or containing a stage or enclosed platform shall be subject to provisions of this Code regulating assembly and stage occupancies.

Reference: Chapters 409 and 411.

401.091—Occupant Capacity

The maximum occupant capacity of buildings or structures and areas or portions and specified occupancy uses thereof, and the capacity of exitways, or corridors, stairs, doors, exits or units thereof, and the distance of travel to exit, shall not

exceed the capacity and distance specified in this Code for the occupancy under which the building is classified.

Occupant capacity of buildings shall be determined by the specified square feet per occupant of the building and areas or portions and specified occupancy uses thereof, and the capacity of occupancy uses not specified shall be determined by the Building Official, based upon capacity of occupancies or uses of similar character.

The distance of travel to exit shall be the maximum horizontal distance of travel in feet to an exit to the exterior, or to a fire corridor where permitted, or smoke-proof tower, or both of required fire-resistive construction, opening directly to the exterior of the building at grade level.

Distance of travel to exit may be increased as specified for each occupancy in buildings of one-hour fire-resistive construction throughout, and in buildings equipped with an approved automatic sprinkler system.

The aggregate total width of units of exitways shall be determined and based upon the specified number of occupants for each twenty-two (22) inch unit of width, and no single exitway unit shall be less in width than the specified minimum in inches; except, as provided for areas of limited occupant capacity.

The number of exitways or units thereof, shall be determined based upon square feet of area served and heights as specified herein, and by distance of travel to exit, and the total required widths shall be equally divided among the required number.

Widths of aisles, corridors, stairs and doors used as exitways shall be open area exclusive of areas occupied by sales counters, merchandise display racks, furniture, equipment, machinery or storage, and shall be maintained free of all obstructions.

The maximum occupant capacity of rooms or areas used by the public for meeting, dining, entertainment or assembly shall be conspicuously posted by the owner of the building by means of durable metal signs in each such room or area and of such form as approved by the Building Official, and it shall be in violation of this Code to deface or remove such sign or permit more than the legal number of occupants within such room or area.

401.092—Exitways

Exitways and units thereof, shall be provided buildings or structures of such capacity, width and number as determined by the occupant capacity, tributary occupant loads, areas and heights and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, as provided in this Code, this section and for the occupancy under which the building is classified.

The total width of exitways and units thereof, from any story shall be determined by the occupant capacity of that story plus one-half ($\frac{1}{2}$) of the tributary exit travel of the story next above or below; except, the resulting width shall not be less than the required width for the uppermost story considered separately.

The total width in feet of required exitways shall be not less than the total tributary occupant load served divided by fifty (50), and such width shall be equally divided among the required number.

The occupant capacity of exitways and units thereof, may be increased by twenty-five (25) per cent for each increase in width above the minimum width in inches of one-half ($\frac{1}{2}$) unit width or eleven (11) inches; except, such increases shall not exceed one hundred (100) per cent.

Arcades or corridors containing display windows or exits opening from sales rooms, display areas, shops, stores or mercantile establishments shall not be less in width than two hundred (200) per cent of the required width of corridors based on tributary occupant load.

Exitways shall be so located and arranged in all areas or portions of the building as to clearly indicate the direction of exit travel and readily accessible and visible to all occupants or the area shall be posted with adequate signs indicating location of exitways and direction of exit travel.

Exitways shall be so arranged that no pockets or dead ends in excess of twenty-five (25) feet shall exist in any portion or area of the building.

Exitways shall not terminate at any story or point in the direction of exit travel.

Exitways shall not decrease in width or occupant capacity in the direction of exit travel; except, corridors served by two (2) or more required stairways totalling the required occupant capacity may discharge into stairs of lesser width.

Transom openings upon exitways shall not be allowed.

Exitways shall not be more apart than double the specified and allowable travel to exit distance measured along the line of travel.

Exitways shall be of the required width clear and unobstructed and shall not be used for storage of equipment or supplies or display of merchandise; except, required handrails may be included in the width.

Exitways leading into or through kitchens or bakeries serving restaurants or public dining rooms, or through service, storage or hazardous areas, or areas of distinct and individual occupancy, shall not be included in the required number of exitways.

Balconies and mezzanines off the first or ground floor

of less than five hundred (500) square feet in area and with an occupant capacity of less than ten (10) and no tributary load from above may have not less than one exitway.

Exitways of public meeting or dining rooms located on other than the ground floor, shall open directly to an exit stairs or corridor or foyer with direct access to a means of egress to the exterior of the building.

Exitways of public rooms shall be arranged a distance apart equal to not less than one-fifth ($1/5$) of the perimeter of the room.

All fire exits, and exitways thereto, and all exitways from areas of the building to which the public has access shall be marked and illuminated as specified in this Code.

Reference: Chapter 707.

Exitways and corridors, stairs, landings, vestibules, doors and exits to the exterior of the building and courts or passageways leading to a street or publicways shall be illuminated at all times with light of an intensity of not less than one (1) foot candle power at floor level, and all means of egress to the exterior of the building shall be clearly marked and where required illuminated and where required such lighting and illumination shall be from a source independent of the lighting of the building.

Reference: Chapter 707.

401.093—Corridors

Corridors of buildings or structures shall be of such capacity and width as determined by the occupancy capacity and tributary occupant loads of the building and areas or portions and specified occupancy uses thereof, and shall be not less in width than specified for the occupancy under which the building is classified.

Corridors shall lead directly to an exitway to the exterior of the building and dead ends shall extend not more than ten (10) feet beyond an exitway or exit stairway.

Corridors shall be not less in width than the total widths of stairways discharging thereto.

The floor level of corridors shall not vary more than twenty-four (24) inches in any story, and such variation shall be compensated by a ramp of a slope of not more than one (1) in eight (8) and doors of adjoining areas shall not open upon such change of level.

401.094—Stairways

Stairways of buildings or structures shall be of such capacity and width as determined by the occupant capacity and tributary occupant loads of the building and areas or portions and specified occupancy uses thereof, and shall not be less in number than the floor area per story for each

stairway as specified for the occupancy under which the building is classified.

Buildings of specified heights in stories shall be provided with stairways in such number as specified for each occupancy classification and floor areas per story for each stairway and such stairways shall be accessible to all areas of the building.

Allowable areas per story for each stairway may be increased in a specified percentage for each stairway over two (2), for one-hour fire-resistive construction throughout the building and for automatic sprinkler system as provided for the occupancy under which the building is classified.

Buildings of two (2) or more stories in height shall be provided with not less than two (2) stairways accessible to all areas of the building; except, subject to specified areas per story and distance of travel to exit, areas of non-hazard occupancy to which the public does not have access and of an occupant capacity of less than ten (10) may be provided with one (1) stairway.

Basement areas occupied by other than service to the building or storage shall be provided with not less than two (2) stairways and one (1) may lead directly to the exterior of the building at grade level.

Stairways leading to and discharging upon the ground floor from above or below shall lead directly to the exterior of the building or into an exitway with direct access to a means of egress from the building.

Stairways leading to the ground floor from below and discharging into an enclosure or exitway within twenty (20) feet of the discharge of a stairway from above shall be provided with self closing doors and plainly marked as not an exitway.

Ramps with a slope of not more than one(1) in eight (8) may be substituted for required stairways and such ramps shall be not less in width than the required stairway.

In buildings of specified occupancy and heights smoke proof towers are required in place of one (1) or more stairways.

Landings serving stairways shall be not less in the least dimension than the width of the stairway.

Doors shall not open upon stairs or ramps and doors opening upon or swinging into stairway landings shall not reduce the required area of the landing in any dimension.

Escalators permanently adjusted to discharge in the direction of exit travel and upon a corridor, lobby or foyer with direct access to a means of exit to the exterior of the building, may be included as one of the required number of exit stairways; except, the maximum width of such escalator

shall not exceed forty-eight (48) inches or shall a single unit have a vertical travel of more than two (2) stories or thirty-five (35) feet.

Passenger elevators shall not be included as required stairways; except, one such elevator of each elevator bank may be included in reducing occupant load of required exit stairways to the maximum occupant load of the elevator and not more than twenty (20) occupants, provided such elevator discharges upon a corridor, lobby or foyer, with direct access to a means of exit to the exterior of the building.

401.095—Doors and Doorways

Doorways of buildings or structures used as units of exitways shall be of such capacity and width as determined by the occupant capacity and tributary occupant loads of the building and areas or portions and specified occupancy uses thereof.

Required widths of doorways shall be clear unobstructed widths exclusive of door framing, jams and trim, and all doors of exitways shall swing open to full width.

Doors may be used in doorways either single or as multiple units to gain required widths and no single door serving exitways, except as provided for the occupancy under which the building is classified, shall be less than thirty-six (36) inches or more than fifty-four (54) inches in width.

Doors servings as units of exitways shall swing in the direction of exit travel and in areas used by the public shall be arranged to open easily from the inside without use of a key or special knowledge.

Doors swinging into units of exitways shall not reduce the required width of such exitways.

Doors of exitways leading from areas to which the public has access and normally kept latched shall be equipped with approved type panic hardware.

Revolving doors shall not be approved as exit doors and shall have adjacent swinging doors.

Doors of kitchens, bakeries, service or hazardous areas opening into dining rooms, retail shops or areas to which the public has access, shall be not less than Class C or solid wood doors not less than one and three-quarter (1¾) inches in thickness.

Fire doors required for the protection of openings shall be as provided in this Code.

Doors of exits to the exterior of the building shall not swing over publicways, public alleys or streets, or into yards, courts or open spaces so as to reduce required widths, and shall discharge upon a landing at grade level of not less in any dimension than the swing of the exit door.

401.096—Exits to the Exterior

Exits to the exterior of buildings or structures shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than specified herein.

1000 or more occupants...Four (4) exits

500 to 999 occupants....Three (3) exits

10 to 499 occupants.....Two (2) exits

The total required width of exits to the exterior shall be equally divided among the required number, and such exits shall be not more apart than twice the specified distance of travel to exit.

Exits to the exterior shall be not less in width than the total widths of exitways discharging thereto.

Openings to the exterior of the building used for vehicle traffic, receiving or shipping of freight or merchandise, or opening upon loading docks or platforms shall not be approved as exits to the exterior.

Exits to the exterior of the building shall discharge at grade level upon a publicway, public alley or street, or upon a yard, court or open space of not less in width than the total required widths of exits discharging thereto and not less than forty-eight (48) inches in width.

Yards, courts or open space used for the discharge of exits shall have direct access to a publicway, public alley or street, or shall be connected thereto by a passageway not less in width than the required width of the yard, court or open space and not less than eighty-four (84) inches in clear unobstructed height.

401.10—Vertical Openings

Openings in buildings or structures extending vertically through one (1) or more stories, such as stairways, elevator shafts, ducts, vents or chutes, shall be enclosed where and as provided in this section and the corresponding section of the occupancy under which the building is classified, and as provided for Types of Construction, and where required enclosures shall be not less in fire-resistive construction than specified herein.

Reference: Article V.

Stairways leading from the second story to stories above in buildings of more than three (3) stories in height or of more than three thousand (3000) square feet of floor area per story shall be enclosed.

Stairways leading from the first or ground floor to storage or service areas of basements shall be enclosed, and

stairways leading to areas below the first basement shall be enclosed.

Shafts of dumb waiters, vents, ducts or chutes leading to areas below the ground floor shall be enclosed.

Monumental stairs from the ground floor to the first story above or below, or to a balcony or mezzanine may be unenclosed where enclosures are required when equipped with an approved automatic sprinkler system.

Vertical openings of escalators shall be protected as provided in this Code.

Reference: Chapter 706.

Horizontal openings into vertical openings shall be protected as provided in this Code.

Vertical openings of buildings of Type I construction shall be enclosed by not less than two-hour fire-resistive construction.

Vertical openings of buildings of Type II construction shall be enclosed by not less than two-hour fire-resistive construction; except, in buildings of not more than three (3) stories in height equipped with an approved automatic sprinkler system openings may be enclosed by not less than one-hour fire-resistive construction.

Vertical openings of buildings of Type III and IV construction shall be enclosed by not less than one-hour fire-resistive construction.

Vertical openings of buildings of Type V construction shall be enclosed by not less than one-hour fire-resistive construction; except, shafts of dumb waiters or chutes of not more than nine (9) square feet in cross sectional area may be lined with non-combustible material.

Openings extending to or through the roof shall be protected by parapet walls as provided for Types of Construction.

Vertical openings extending to or through the roof and enclosed or covered shall be equipped with an approved automatic fire valve.

401.11—Light, Ventilation and Sanitation

Buildings or structures and rooms, areas or portions and specified occupancy uses thereof, of human habitation or used by the public for assembly, educational, institutional, commercial or industrial purposes or as places of employment, shall have floors and ceilings of not less in area and height than specified herein and shall be provided with sanitation facilities, light and ventilation as specified in this section and subsections and corresponding sections of the occupancy under which the building is classified.

Sanitation facilities and equipment as specified in this

Code shall be the minimum number required based on occupant capacity and installation shall be as provided by prevailing plumbing regulations and health requirements.

Note: State Labor Departments generally have additional regulations affecting buildings and occupancies used as places of employment.

401.111—Ceiling Heights, Room Areas, Light and Ventilation.

Ceiling heights and room areas shall be as provided for each occupancy classification and; except as provided, rooms and areas of human habitation, places of employment or for use of the public shall have ceiling heights of not less than eight (8) feet and areas of rooms shall be not less than one hundred (100) square feet.

Areas and rooms shall be provided with windows as specified for each occupancy classification of such size and open area to provide light and ventilation to all areas; except, artificial light and a mechanical ventilating system of such capacity and of a specified class as defined herein, may be substituted.

Automatic ventilating systems may be used in substitution of natural ventilation and such systems as are used or required for specified areas shall be as approved by the Building Official, and for the purpose of administering this Code shall be classified by capacity as defined herein.

Class I; shall be capable of completely changing the air of the area not less than two (2) times each hour.

Class II; shall be capable of completely changing the air of the area not less than four (4) times each hour.

Class III; shall be capable of changing the air of the area at a rate of three (3) cubic feet per minute for each square foot of floor area.

Ventilating systems where used or required shall be in operation at all times the area is occupied.

Vents or ducts used in connection with mechanical ventilating systems shall be installed as provided in this Code.

Areas or rooms used as single family dwelling units and rooms used for sleeping shall be provided with windows of an area not less than ten (10) per cent of the floor area and not less than fifty (50) per cent of the window area shall open for ventilation; except, a Class I mechanical ventilating system may be substituted in lieu of window openings.

Areas or rooms used as mercantile establishments, sales rooms, offices or manufacturing shall be provided with windows of an area not less than twelve and one-half (12½) per cent of the floor area and fifty (50) per cent of the window area shall open for ventilation; except, a Class II

mechanical ventilating system may be substituted in lieu of window openings.

Areas used as kitchens of restaurants and public or institutional dining rooms shall be provided with a Class III mechanical ventilating system.

Skylights may be used by areas located on the upper story of the building in lieu of required windows, and shall be of the required area and not less than fifty (50) per cent shall open for ventilation.

401.112—Sanitation Facilities

Buildings or structures and areas or portions and specified occupancy uses thereof, shall be provided with sanitation facilities as specified for the occupancy under which the building is classified.

Areas of buildings used for purposes other than single family occupancy, shall be provided with not less than one (1) toilet room on each floor for each sex and each toilet room shall contain not less than one (1) water closet and one (1) lavatory, and each building or area thereof, shall have in addition not less than one (1) toilet room for each sex equipped as determined by the occupant capacity of the building or area, and toilet rooms shall be located as to be readily accessible to all occupants.

Toilet rooms shall be provided with light and ventilation by windows located in an exterior wall of the building of not less in area than ten (10) per cent of the floor area of the room and a minimum of three (3) square feet, not less than fifty (50) per cent of which shall open for ventilation or the room shall be provided with artificial lighting and a Class II mechanical ventilating system.

Toilet rooms of all places of employment shall be provided with lavatories and hot and cold running water, and in buildings of a dusty or dirty environment or where employees are exposed to poisonous, infectious or irritating materials shall be provided with shower rooms with hot and cold running water and equipped with not less than one (1) shower for each fifteen (15) employees or fraction thereof.

Showers and water closets shall be enclosed in individual compartments of not less than thirty (30) inches in width with partitions and doors extending to within twelve (12) inches of the floor and not less than sixty-six (66) inches above the floor.

Toilet rooms accessible to the public or for use by employees shall have floors and walls finished with a smooth hard surface of cement, tile or approved materials to a height of forty-four (44) inches and in an area not less than twenty-four (24) inches each way around water closets, urinals, lavatories and showers.

Entrances of toilet rooms shall be provided with a self closing solid, tight fitting door of such width as required based upon an occupant capacity of forty (40) for each twenty-two (22) inch unit of width and not less than thirty (30) inches in width.

Toilet rooms of establishments manufacturing, preparing, storing or serving food products shall have walls, ceilings and floors of a non-absorbent interior finish, and shall have a vestibule type entrance equipped with self closing solid doors.

Locker rooms where required shall be separated from toilet and shower rooms and shall be located adjacent thereto.

401.113—Drinking Fountains

Buildings or structures and areas or portions and specified occupancy uses thereof, other than buildings of single family occupancy uses thereof, other than buildings of single family occupancy, shall be provided with drinking water of an approved source and of a temperature of not less than forty (40) or more than seventy (70) degrees fahrenheit.

An approved type drinking fountain shall be provided for each fifty (50) employees or occupants or fraction thereof and for each one hundred (100) patrons or fraction thereof, and required fountains shall be conveniently located and the required number shall be equally distributed throughout the building or area.

401.12—Heating Equipment and Installation

Heating units or apparatus generating heat, chimneys, boiler or furnace rooms and special appliances or equipment for heating buildings or structures; except, as specified in corresponding sections and subsections regulating the occupancy use under which the building is classified, shall be installed, located or constructed as provided in this section.

Reference: Article X.

Wiring or electrical connections and connections to water or sewer lines shall be subject to requirements of prevailing electrical and plumbing regulations.

401.121—Chimneys, Flues, Vents and Ducts

Chimneys and vents shall be provided each heating unit or appliance as provided in this Code.

Reference: Chapter 709.

All ducts shall be constructed and installed as provided in this Code.

Patented, packaged or manufactured chimneys, flues or vents of approved types may be used for specified uses and purposes, and where permitted, subject to approval of the Building Official, shall be installed in accordance with ap-

proved specifications of the manufacturer.

401.122—Furnaces and Boilers

Furnaces and boilers shall be located in a furnace or boiler room and protected from other areas of the building as provided in this Code for boiler rooms.

401.123—Boiler Rooms

Boiler rooms or rooms or areas of buildings of more than two (2) stories in height, containing heating equipment using solid or liquid fuels, shall be separated from other areas of the building by not less than a three-hour fire-resistive separation; except, a one-hour fire-resistive separation may be used in buildings of Type V construction.

Areas containing boilers with a capacity of more than fifteen (15) pounds of steam or with a rating of more than ten (10) boiler horsepower shall be separated from all other areas of the building by not less than a four-hour fire-resistive separation.

Openings to the exterior of the building from boiler rooms located less than ten (10) feet from adjoining buildings, adjacent property lines or other exterior openings of the building, or as restricted in this Code, shall be protected by not less than one-hour fire-resistive construction.

Reference: Section 401.08.

Buildings or structures housing high pressure boilers shall be subject to requirements as contained in this Code for Group L Occupancy.

Reference: Chapter 413.

401.124—Coal Pocket or Bins

Areas of buildings or structures used as coal pockets or bins and used for the storage of coal or solid fuels shall be constructed as provided in this Code for Group K Occupancy.

Reference: Chapter 412.

401.125—Fuel Tanks and Containers

Tanks or containers for liquid or gas fuels shall be as provided in this Code.

401.126—Spaceheaters

Spaceheaters shall be installed and vented as provided by this Code, and portable or individual room heaters shall not be permitted except, when vented or heated electrically.

Reference Chapter 709.

401.127—Fireplaces

Fireplaces shall be installed as provided by this Code, and gas or oil fired artificial fireplaces shall be vented.

Reference: Chapter 709.

401.128—Incinerators

Incinerators where installed in buildings shall be installed and vented as provided in this Code.

401.129—Water Heaters and Miscellaneous Appliances

Water heaters, laundry room equipment and miscellaneous appliances shall be subject to approval of the Building Official and shall be installed and maintained as provided in this Code.

401.13—Storage and Special Hazards

Areas or portions of buildings or structures used for purposes other than specified for the occupancy under which the building is classified or for storage, service or special hazard uses; except as provided in this section and corresponding sections of the occupancy under which the building is classified, shall be classified under the occupancy the use most nearly resembles and shall be subject to provisions of this Code regulating such occupancy use.

Reference: Subsection 401.016.

401.131—Storage

Storage of merchandise, products or materials in such quantity necessary for current requirements of sales or manufacture may be permitted in buildings or structures classified under such occupancy uses; except, storage of hazardous materials or products and storage in excess of current requirements shall be in areas classified under storage occupancy and shall be subject to provisions of this Code regulating such occupancies.

401.132—Volatile Liquids

Volatile flammable liquids shall not be placed or stored in quantity other than necessary for current uses, and such quantity as is permitted shall be stored in rooms or areas of not less than two-hour fire-resistive construction, and doors to such room or area shall normally be kept closed; except, storage of volatile liquids shall be as provided for Group L Occupancy.

Reference: Chapter 413.

401.133—Film

Photographic or motion picture film shall not be stored in buildings or structures, except as provided for buildings of Group L Occupancy.

Reference: Chapter 413.

401.134—Furniture Storage and Repair

Furniture, mattresses, bedding or repair materials in excess of requirements for current replacement and repair shall not be stored in buildings or structures; except, buildings of Groups K and L Occupancy, and such storage as is

permitted shall be in rooms or areas of not less than one-hour fire-resistive construction.

Service areas for repair or refinishing of furnishings shall be separated from adjoining areas by not less than two-hour fire-resistive separation.

401.135—Paint Storage

Paints, lacquers or finishes shall not be stored in quantity in excess of current maintenance or sales requirements and shall be in sealed containers and stored in rooms or areas of not less than two-hour fire-resistive construction.

401.136—Loading Docks

Loading docks and receiving or shipping room areas shall be separated from other areas by not less than one-hour fire-resistive construction.

401.137—Parking of Vehicles

Vehicles shall not be parked closer than eight (8) feet to exitways or doors.

401.14—Fire Protective Equipment

Fire protective equipment shall be provided buildings and structures as provided in this section and corresponding sections and subsections regulating the occupancy use under which the building is classified, and where required shall be approved type and shall be installed, located or constructed as provided in this Code and this section.

Reference: Chapter 710.

401.141—Fire Extinguishers

Fire extinguishers shall be provided all buildings or structures; except, buildings of Group A Occupancy, of more than two (2) stories in height and of more than three thousand (3000) square feet of area per story and shall be installed and located at or near each exitway on each floor and not more than one hundred (100) feet apart in corridors or exitways.

401.142—Alarm systems

Alarm systems shall be required as provided by the occupancy under which the building is classified and in all buildings used above or below the ground floor by forty (40) or more occupants and in buildings used above the second story or below the first basement by twenty (20) or more occupants, and where required shall be installed as provided in this Code.

Reference: Chapter 715.

401.143—Sprinkler Systems

Automatic sprinkler systems where required or installed shall be installed as provided in this Code.

401.144—Standpipes

Interior wet standpipes where required shall extend from the basement to the uppermost story or level and outlets shall be located that all portions of the building may be reached with a seventy-five (75) foot length of hose.

Dry standpipes shall be required in buildings of three (3) or more stories in height and one (1) such standpipe shall be required for each ten thousand (10,000) square feet or fraction thereof, of floor area per story and standpipes shall be located within stairway enclosures or as near stairways as practical.

401.145—Fire Valves

Vertical openings of buildings or structures of two (2) or more stories in height, including elevator shafts, smoke proof towers, enclosed stairways and shafts, chutes or vents, leading to the roof and enclosed or covered shall be provided with an automatic fire valve, installed as provided in this Code.

401.146—Access Panels

Exterior walls of buildings of two (2) or more stories in height facing upon publicways, public alleys or streets and containing no openings therein, shall be provided with access panels installed as provided in this Code.

401.147—Gas Service Shutoff

Gas service lines of buildings or structures; except, buildings of Group A Occupancy, shall be provided with a shut-off valve conspicuously located outside the building and readily accessible, and the shut-off valve may be enclosed and provided with a cabinet with a standard lock when approved by the Building Official and Fire Department.

401.15—Special Equipment

Special apparatus, equipment or appliances installed in buildings or structures and becoming an integral part or portion of the structure; except, as specified in corresponding sections and subsections regulating the occupancy use under which the building is classified, shall be installed, located or constructed as provided in this section.

Wiring or electrical connections and connections to water or sewer lines of special apparatus shall be subject to requirements of prevailing electrical and plumbing regulations.

401.151—Elevators and Escalators

Elevators or escalators where installed shall be as provided by this Code.

401.152—Dumb Waiters

Dumb waiters where installed shall be constructed as provided in this Code.

Section 401.153

Lifts

401.153—Lifts

Mechanical vertical lift devices may be used for transporting attendants of garages or employees of other occupancies, where approved by the Building Official, from one story to another and such lifts shall not be used by the public, and shall be installed and protected as provided in this Code.

401.154—Vehicle Lifts

Devices for raising vehicles for the purpose of service or repair shall be installed in buildings or structures as provided by the manufacturer's specifications, subject to approval of the Building Official.

401.155—Mechanical Refrigeration

Mechanical refrigeration units or systems shall be installed and maintained as provided in this Code.

401.156—Mechanical Air Conditioning

Mechanical air conditioning units and systems shall be installed as provided in this Code.

401.157—Marquees and Canopies

Marquees and canopies shall be constructed and attached to buildings as provided in this Code.

401.158—Signs

Outdoor signs attached to buildings shall be constructed, attached and maintained as provided in this Code.

CHAPTER 402

GROUP A

DWELLING OCCUPANCY

402.01—Group A Occupancy Defined

Group A Occupancy shall include buildings or structures and areas or portions thereof, of dwelling occupancy housing not more than two (2) single family units and residential occupancy of an occupant capacity of less than ten (10) and may include:

Rooming Houses

Lodging Houses

Dormitories

Reference: Subsection 401.016.

Reference: Chapter 401—General occupancy requirements.

402.02—Type of Construction

Buildings of Group A Occupancy may be of Types I, II, III, IV or V construction.

Reference: Article V.

Buildings of more than three thousand (3000) square feet in floor area per story above the first floor shall be of not less than one-hour fire-resistive construction throughout; except, interior partitions of single family units, may be of less fire-resistive construction.

Prefabricated or factory assembled single-family dwellings where permitted shall be as provided in this Code.

Reference: Section 402.161.

402.03—Fire District Requirements

Buildings of Group A Occupancy of Type IV or V construction shall not be permitted in Fire Zone I.

Reference: Article III.

402.04—Design and Loading

Buildings of Group A Occupancy and areas or portions thereof of specified occupancy uses shall be designed for unit live loads of pounds per square foot of floor area as provided in this Code and this Section, and as specified in Table No. 402-A.

Reference: Chapter 601.

Table No. 402-A
Unit Live Loads—Group A

Occupancy Use	Pounds per sq. ft.
Apartments	40
Corridors	40
Dormitories	40
Dwellings	40
Stairways	100

Unit live loads of occupancy uses not specified in this Section shall be determined on the basis of occupancies of similar character.

402.05—Mixed Occupancy Separation

Buildings of Group A Occupancy and areas or portions thereof, shall be separated from specified areas and other occupancies of the same building by an occupancy separation of not less in hours of fire-resistive construction than specified in this section and in Table No. 402-B.

Reference: Subsection 401.053.

Table No. 402-B
Mixed Occupancy Separations—Group A

Occupancy Separations—Group A														
Group Occupancy	A	B	C	D	E	F	G	-H-		I	J	K	L	M
Separation in hours	x	1	1	1	2	3	2	3	2	1	4	2	4	1

Single family units of buildings of more than one family shall be separated from corridors, stairways and other single family units by not less than one-hour fire-resistive construction, and doors of such units leading into corridors or stairways shall be of solid wood not less than one and three-eighths (1 $\frac{3}{8}$) inches in thickness, or the equivalent.

Attached private garages, carports and accessory structures of not more than four hundred (400) square feet in area and one (1) story in height may be separated from buildings of dwelling occupancy by a separation wall and ceiling of one-hour lathe and plaster on the accessory building side, and connecting doors shall be of solid wood not less than one and three-eighths (1 $\frac{3}{8}$) inches in thickness or the equivalent, and shall not lead into any room used for sleeping purposes.

402.06—Allowable Floor Area

Buildings of Group A Occupancy shall not exceed the floor areas in square feet per story specified in this section and in Table No. 402-C.

Table No. 402-C
Allowable Floor Area—Group A

Type of Construction	I	II	III	IV	V
Fire Zone I	UL	UL	600	600	NP
II	UL	UL	1800	1800	1800
Outside Fire District	UL	UL	UL	UL	UL

Allowable floor areas as specified in Table No. 402-C may be increased as provided herein and in Table No. 402-D, and when applicable, increases in percentage of floor area per

story as specified for limited heights, one-hour fire-resistive construction, and excess exposure distances may be compounded; except, increases shall not be allowed for one-hour fire-resistive construction where required by other provisions of this Code.

Table No. 402-D
Allowable Increases in Floor Area—Group A

Increases Allowable	No. Stor-ies	Percentage of Increase Type of Construction				
		I	II	III	IV	V
Limited Heights- not more than	3	UL	UL	40	40	40
	2			75	75	75
One-hour Const.-	x			50	50	50

Excess Exposure Distance—Reference: Subsection 401.062.

402.07—Limiting Heights

Buildings of Group A Occupancy shall not exceed the limiting heights in stories or the maximum height in feet specified in this section and in Table No. 402-E.

Table No. 402-E
Limiting Heights in Stories—Group A

Types of Construction	I	II	III	IV	V
Fire Zone I	UL	3	2	1	NP
II	UL	3	3	2	2
Outside Fire District	UL	3	3	3	3
Maximum Ht. in Feet	UL	45	45	45	38

Limiting heights as specified in Table No. 402-E may be increased as provided herein; except, increases shall not be allowed for one-hour fire-resistive construction throughout or automatic sprinkler system where required by other provisions of this Code, or when increases in area have been allowed for such construction or equipment.

Limiting heights may be increased by one (1) story, or fifteen (15) feet, in buildings of Types III, IV or V of one-hour fire-resistive construction throughout, or when equipped with an approved automatic sprinkler system.

402.08—Exterior Walls and Protection of Openings

Exterior bearing walls or portions of such walls and allowable openings therein, of buildings of Group A Occupancy located less than the specified exposure distance from adjacent property lines shall be of not less in fire-resistive construction than specified in this section and in Table No. 402-F.

Table No. 402-F
Fire-Resistance of Exterior Bearing Walls
and Protection of Openings—Group A

Protection of Openings—Group A								
Type of Const.	Exposure Distance in feet	Exterior Walls						
		Construction in hours			Protection of Openings in hours			
Fire Zones—		I	II	O	I	II	O	
I	Less 3				NP	NP	NP	
	Less 30		4	4				
	Less 50	4						
	Minimum	INC	INC	INC	1	1	1	
II	Less 3				NP	NP	NP	
	Minimum	4	4	4	1	1	1	
III	Less 3				NP	NP	NP	
	Less 10					1	1	
	Less 20				1			
	Minimum	4	4	4				
IV	Less 3	4	4	1	NP	NP	NP	
	Less 5						1	
	Less 10		2			1		
	Less 20	2			1			
	Minimum	1	1					
V	Less 3		4	1		NP	NP	
	Less 10		2			1		
	Minimum		1					

Buildings shall face upon a street or public way of such size and width to provide an exposure distance of not less than twenty (20) feet in the entire length of one (1) exterior wall, and such exposed exterior wall shall contain the main entrance and exit of the building at grade level.

402.09—Occupant Capacity and Exitways

The occupant capacity of buildings or structures of Group A Occupancy and areas or portions and specified occupancy uses thereof, and the required number, width and capacity of exitways and units thereof, shall be as provided in this Code, this section and subsections.

Buildings of Group A Occupancy of not more than three (3) stories in height; except as provided herein, shall be exempt from provisions of Section 401.09.

Exitways shall include corridors, lobbies, foyers, arcades, aisles, stairways, ramps, landings, doors, vestibules, exits

or other areas serving in whole or in part as a required means of exit travel to the exterior of the building, and exitways shall terminate upon a publicway, public alley or street or upon a yard, court or open space with direct access to a publicway, public alley or street.

402.091—Occupant Capacity

The maximum occupant capacity of buildings or structures of Group A Occupancy and areas or portions and specified occupancy uses thereof, and the capacity of exitways or corridors, stairways, doors and exits or units thereof, and the distance of travel to exit, shall not exceed the capacity and distance specified in this Code and in Table No. 402-G.

Table No. 402-G
Maximum Occupant Capacity—Group A

Occupant Use	Occupant Capacity Sq. Ft. per Occupant	Travel to Exit (feet)	Number of Occupants per 22" Unit Width			
			Corridor	Exit Stairs	Exit Doors	Exits to exterior
Dwelling:						
Single family	300	100	40	30	40	40
Rooming Houses	125	100	40	30	40	40
Lodging houses	125	100	40	30	40	40
Dormitories	100	100	40	30	40	40
Maximum—						
Non-sprinkled		100				
sprinkled		133				
Minimum width in inches			44	44	36	44

Occupant capacity shall be determined based upon specified square feet of area per occupant.

402.092—Exitways

Exitways and units thereof, shall be provided buildings of Group A Occupancy of such capacity, width and number as provided herein.

All areas of buildings of two-family dwellings and basements occupied by other than storage or service to the building and each unit of single family occupancy thereof shall have access to not less than two (2) exitways leading to the exterior of the building at grade level.

402.093—Corridors

Corridors of buildings of Group A Occupancy of more than single-family dwelling shall be not less than forty-four (44) inches in width.

402.094—Stairways

Stairways of buildings of Group A Occupancy shall be as specified in subsection 402.091 based on occupant capacity and in this subsection for areas per story and in Table No. 402-H.

Reference: Chapter 705.

Table No. 402-H

Required Stairways based on Area per Story—Group A

Heights in Stories	Area per Story per Stairway in Sq. Ft. Type of Construction	
	I - II	III - IV - V
Not more than 2	5000	4500
Not more than 3	3300	3000
More than 3	3000	

Buildings of three (3) stories in height shall have not less than two (2) stairways accessible to all areas of the building.

Basement areas occupied by other than storage or service to the building shall have not less than two (2) stairways and one (1) may lead directly to the exterior of the building at grade level.

Stairways shall be of not less than forty-four (44) inches in width; except, stairways of single-family dwelling serving a tributary occupant load of less than fifty (50) occupants may be reduced to thirty-six (36) inches in width.

In buildings of one-family dwellings and not more than two (2) stories in height circular type stairs with winders may be used and the treads shall not be less in width at any point than eight (8) inches exclusive of nosing.

Ramps with a slope not greater than one (1) in eight (8) feet may be substituted for required stairways; and such ramps shall be not less in width than the required stairway.

402.095—Doors and Doorways

The required width of doors used as exits in buildings of Group A Occupancy or portions thereof, shall be based upon occupant capacity as specified in subsection 402.091 and shall be not less than thirty-six (36) inches in width.

Doors used as exits shall swing in the direction of exit travel and be arranged as to open easily from the inside without use of a key or special knowledge.

Doors of single family units opening into corridors or stairways, may swing inward and shall be of Class C or of

solid wood not less than one and three-eighths (1½) inches in thickness.

Revolving doors shall not be approved as exit doors and shall have adjacent swinging doors.

Exit doors opening to the exterior of the building at grade level shall not swing over sidewalks or public property and shall open upon a landing not less in dimension in any direction than the swing of the door.

402.10—Vertical Openings

Vertical openings in buildings of Group A Occupancy shall be enclosed as provided in this code and this section.

Reference: Section 401.10

Stairways and openings shall be enclosed above the second story.

Openings of stairways leading from the basement shall be enclosed at the first floor level.

Chutes or shafts leading to the basement shall be enclosed.

402.11—Light, Ventilation and Sanitation

Buildings of Group A Occupancy and rooms or areas thereof, of human habitation or used as single family units for living, eating and sleeping purposes, shall have floors and ceilings of not less in area and height than specified herein and shall be provided with sanitation facilities, light and ventilation as specified in this section.

Reference: Section 401.11.

Table No. 402-I

**Minimum Ceiling Heights, Room Area and Window Area
Group A**

Occupancy Use	Ceiling Height feet	Floor Area sq. ft.	Window		Ventilating System Class
			Area %	Open- ing %	
Dwelling-					
Living rooms	7½	100	10	50	I
Dining rooms	7½	100	10	50	I
Bedrooms	7½	100	10	50	I
Kitchens	7½	50	10	50	I
Bathrooms	7½	50	10	50	I

402.111—Ceiling Heights, Room Areas, Light and Ventilation

Minimum ceiling heights and floor areas of rooms or areas used for human habitation and the required window area based on percentage of floor area and the percentage of window required to open for ventilation shall be as provided

in this subsection and in Table No. 402-I.

Ceiling heights of rooms of single family dwelling units may be less in height than specified in Table No. 402-I in not more than fifty (50) per cent of the floor area and the lowering of ceiling heights shall be on an angle to horizontal and no portion of the ceiling shall be less than four (4) feet above the floor level.

Artificial lighting and a Class I automatic ventilating system as defined in this Code, may be substituted in lieu of required window areas.

Reference: Subsection 401.111.

402.112—Sanitation Facilities

Single family dwelling units shall be provided with a toilet room containing a water closet and bath tub or shower and each kitchen shall be provided with a sink.

Lodging, rooming houses or dormitories shall be provided with not less than one (1) toilet room on each floor for each sex and each toilet room shall contain a water closet and lavatory.

402.12—Heating Equipment and Installation

Heating units or apparatus generating heat, chimneys, boiler or furnace rooms and special appliances or equipment for heating buildings of Group A Occupancy shall be installed, located or constructed as provided in this Code and this section.

Reference: Section 401.12.

402.13—Storage and Special Hazards

Areas or portions of buildings of Group A Occupancy shall not be used for storage, service or special hazard use.

Reference: Section 401.13.

402.14—Fire Protective Equipment

Fire protective equipment where required or installed in buildings of Group A. Occupancy shall be of approved type and shall be installed as provided in this Code and this section.

Reference: Section 401.14.

402.15—Special Equipment

Special apparatus, equipment or appliances installed in buildings of Group A Occupancy and becoming an integral part or portion of the structure and affecting the occupants thereof, shall be installed, located or constructed as provided in this Code and this section and subsections.

Reference: Section 401.15.

402.16—Special Occupancy

402.161—Prefabricated Construction

Definition

Prefabricated Assembly is a structural unit, the integral parts of which have been built up or assembled prior to incorporation in the building.

Materials

Every approval of a material not specifically mentioned in this Code shall incorporate as a provision the kind and number of tests to be made during prefabrication.

Tests of Assemblies

The Building Official may require special tests to be made on assemblies to determine their durability and weather resistance.

Connections

Every device designed to connect prefabricated assemblies shall be capable of developing the strength of the members connected, and connections between roofs and the supporting walls shall be capable of withstanding an uplift equal to five (5) pounds per square foot of roof.

Pipes

In structural design, due allowance shall be made for any material to be removed for the installation of pipes, conduits, or other equipment.

Certificate of Inspection

Materials and the assembly thereof shall be inspected to determine compliance with this Code, and every material shall be grade marked or labeled where required in other types of construction.

A certificate of approval shall be furnished with every prefabricated assembly; except, where the assembly is really accessible to inspection at the site, and the certificate of approval shall certify that the assembly in question has been inspected and meets all the requirements of this Code.

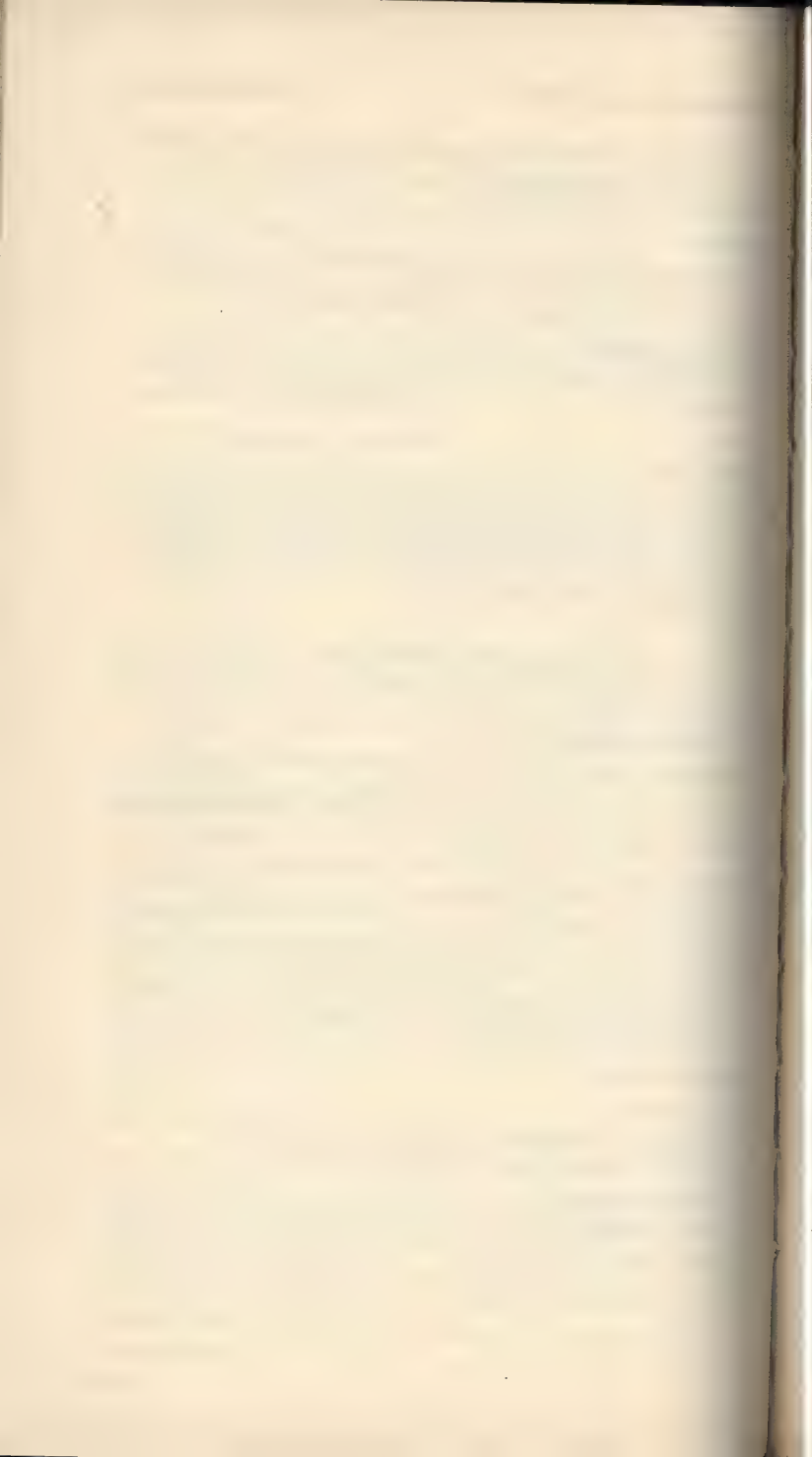
When mechanical equipment is installed so that it cannot be inspected at the site, the certificate of approval shall certify that such equipment complies with the ordinances applying thereto.

Field Erection

Placement of prefabricated assemblies at the building site shall be inspected to determine compliance.

Continuous Inspection

When continuous inspection is required for certain materials where construction takes place on the site, it shall also be required where the same materials are used in prefabricated construction.



CHAPTER 403

GROUP B

RESIDENTIAL OCCUPANCY

403.01—Group B. Occupancy Defined

Group B Occupancy shall include buildings or structures and areas or portions thereof, of residential occupancy housing more than two (2) single family units or of an occupant capacity of ten (10) or more, and shall include:

Hotels	Apartment Buildings
Multiple Dwellings	Motels
Rooming Houses	Lodging Houses
Convents	Monasteries
Dormitories	Club Houses

Reference: Subsection 401.016

Reference: Chapter 401—General occupancy requirements.

403.02—Type of Construction

Buildings of Group B Occupancy may be of Type I, II, III, IV or V construction.

Reference: Article V.

Not more than two (2) family units or ten (10) occupants shall be housed on a single story above the first story in buildings of Type V construction.

Buildings of more than three thousand (3000) square feet in floor area per story above the first story or of three (3) or more stories in height shall be of not less than one-hour fire-resistive construction throughout; except, interior partitions of single family units, and non-hazardous areas, may be of less fire-resistive construction.

403.03—Fire District Requirements

Buildings of Group B Occupancy of Types IV or V construction shall not be permitted in Fire Zone I and of Type V shall not be permitted in Fire Zone II.

Reference: Article III.

403.04—Design and Loading

Buildings of Group B Occupancy and areas or portions thereof of specified occupancy uses shall be designed for unit live loads of pounds per square foot of floor area as provided in this Code and this Section, and as specified in Table No. 403-A.

Reference: Chapter 601.

Unit live loads of occupancy uses not specified in this Section shall be determined on the basis of occupancies of similar character.

Floors of areas where partitions are subject to be relocated shall be designed to support in addition to specified loads,

Table No. 403-A
Unit Live Loads—Group B

Occupancy Use	Pounds per sq. ft.
Apartments	40
Balconies-	
Exterior	100
Interior-no seating	50
Corridors-	
Private	40
Public	100
Dance floors	100
Dining rooms—public	100
Dormitories	50
Foyers and lobbies	100
Dwellings—multi-family	40
Hotels-	
Guest rooms	40
Corridors—private	40
—Public	100
Meeting rooms	100
Loading docks	250
Lodges and clubs-	
Rooms	50
Halls	100
Motels	40
Marquees	60
Offices	50
Public rooms	100
Rest rooms	50
Resaturants	100
Shipping rooms	150
Stairways	100
Storage-	
Light	125
Heavy	250

a uniformly distributed load equal to twenty (20) pounds per square foot.

403.05—Mixed Occupancy Separation

Buildings of Group B Occupancy and areas or portions thereof, shall be separated from specified areas and other occupancies of the same building by an occupancy separation of not less in hours of fire-resistive construction than specified in this section and in Table No. 403-B.

Reference: Subsection 401.053.

Table No. 403-B
Mixed Occupancy Separations—Group B

Group Occupancy	A	B	C	D	E	F	G	-H-		I	J	K	L	M
Separation in hours	1	x	1	1	2	3	2	3	2	1	4	2	4	1

Motels shall be separated each third unit by not less than one-hour fire-resistive construction.

Single family units shall be separated from corridors, stairways and other single family units by not less than one-hour fire-resistive construction, and doors of such units leading into corridors or stairways shall be of solid wood not less than one and three-eighths (1 $\frac{3}{8}$) inches in thickness, or the equivalent.

Kitchens, bakeries and service areas of other than single family units, supplying food to restaurants, dining rooms or public rooms, shall be separated from adjoining areas by not less than one-hour fire-resistive construction.

403.06—Allowable Floor Area

Buildings of Group B Occupancy shall not exceed the floor areas in square feet per story specified in this section and in Table No. 403-C.

Allowable floor areas as specified in Table No. 403-C may

Table No. 403-C
Allowable Floor Area—Group B

Type of Construction	I	II	III	IV	V
Fire Zone I	UL	6300	4200	NP	NP
II	UL	7200	4800	4500	NP
Outside Fire District	UL	9900	7800	6600	4200

Table No. 403-D
Allowable Increases in Floor Area—Group B

Allowable Increases	No. Stor- ies	Percentage of Increase Type of Construction				
		I	II	III	IV	V
Limited Heights- not more than	3	UL	40	40	40	40
	2		75	75	75	75
One-hour Contr.-	x		50	50	50	50
Sprinkler system- more than	1		200	200	200	x
	1		300	300	300	x

Excess Exposure Distance—Reference: Subsection 401.062.

be increased as provided herein and in Table No. 403-D, and when applicable, increases in percentage of floor area per story as specified for limited heights, one-hour fire-resistive construction, automatic sprinkler system and excess exposure distances may be compounded; except, increases shall not be allowed for one-hour fire-resistive construction or automatic sprinkler system where required by other provisions of this Code.

403.07—Limiting Heights

Buildings of Group B Occupancy shall not exceed the limiting heights in stories or the maximum height in feet specified in this section and in Table No. 403-E.

Table No. 403-E
Limiting Heights in Stories—Group B

Types of Construction	I	II	III	IV	V
Fire Zone I	UL	4	3	NP	NP
II	UL	4	3	2	NP
Outside Fire District	UL	5	3	2	2
Maximum Ht. in Feet	UL	85	65	45	45

Hotels of more than three (3) stories in height shall be of Type I construction.

Motels shall not exceed two (2) stories in height.

Limiting heights as specified in Table No. 403-E may be increased as provided herein; except, increases shall not be allowed for one-hour fire-resistive construction throughout or automatic sprinkler systems where required by other provisions of this Code, or when increases in area have been allowed for such construction or equipment.

Limiting heights may be increased by one (1) story, or fifteen (15) feet, in buildings of Types III, IV or V of one-hour fire-resistive construction throughout, or when equipped with an approved automatic sprinkler system.

403.08—Exterior Walls and Protection of Openings

Exterior bearing walls or portions of such walls and allowable openings therein, of buildings of Group B Occupancy located less than the specified exposure distance from adjacent property lines shall be of not less in fire-resistive construction than specified in this section and in Table No. 403-F.

Buildings shall face upon a street or public way of such size and width to provide an exposure distance of not less than twenty(20) feet in the entire length of one (1) exterior wall, and such exposed exterior wall shall contain the main entrance and exit of the building at grade level.

Table No. 403-F
Fire-Resistance of Exterior Bearing Walls
and Protection of Openings—Group B

Type of Const.	Exposure Distance in feet	Exterior Walls					
		Construction in hours			Protection of Openings in hours		
Fire Zones—		I	II	O	I	II	O
I	Less 3				NP	NP	NP
	Less 30		4	4			
	Less 50	4					
	Minimum	INC	INC	INC	1	1	1
II	Less 3				NP	NP	NP
	Minimum	4	4	4	1	1	1
III	Less 3				NP	NP	NP
	Less 10					1	1
	Less 20				1		
	Minimum	4	4	4			
IV	Less 3		4	1		NP	NP
	Less 5						1
	Less 10					1	
	Minimum		1				
V	Less 3			1			NP
	Less 5						1

NP—Not Permitted. INC—Incombustible.

403.09—Occupant Capacity and Exitways

The occupant capacity of buildings or structures of Group B Occupancy and areas or portions and specified occupancy uses thereof, and the required number, width and capacity of exitways and units thereof, shall be as provided in this Code and as specified in this section and subsections.

Reference: Section 401.09.

Residential units of single family occupancy; except as specified, shall be exempt from the provisions of this section and subsection.

Exitways shall include corridors, lobbies, foyers, arcades, aisles, stairs, ramps, landings, doors, vestibules, exits or other areas serving in whole or in part as a required means of exit travel to the exterior of the building, and exitways shall terminate upon a publicway, public alley or street, or upon a yard, court or open space with direct access to a publicway, public alley or street.

403.091—Occupant Capacity

The maximum occupant capacity of buildings or structures

of Group B Occupancy and areas or portions and specified occupancy uses thereof, and the capacity of exitways or corridors, stairways, doors and exits or units thereof, and the distance of travel to exit, shall not exceed the capacity and distance specified in this Code and in Table No. 403-G.

Table No. 403-G
Maximum Occupant Capacity—Group B

Occupant Use	Occupant Capacity Sq. Ft. per Occupant	Travel to Exit (feet)	Number of Occupants per 22" Unit Width			
			Corridor	Exit Stairs	Exit Doors	Exits to exterior
Residential:						
Hotels—						
dining rooms	15	100	100	60	80	100
lobbies	15	100	100	60	80	100
meeting rooms	15	100	100	60	80	100
guest rooms	125	100	40	30	40	60
dance floors	7	100	100	60	80	100
Multi Dwelling—						
single-family units	125	50	40	30	40	40
Rooming houses	300	100	40	30	40	40
Convents	125	100	40	30	40	40
Dormitories	100	100	40	30	40	40
Monasteries	125	100	40	30	40	40
Club houses	100	100	40	30	40	50
Apartment buildings	125	100	40	30	40	40
Maximum—						
Non-sprinkled		100				
sprinkled		133				
Minimum width in inches—			44	44	36	72

Occupant capacity shall be determined based upon specified square feet of area per occupant.

The aggregate total widths of exitways and units thereof, shall be determined based upon the specified number of occupants and tributary occupant load for each twenty-two (22) inch unit of width, and no single unit shall be less in width than the specified minimum in inches.

The number of exitways or units thereof, shall be determined based upon square feet of area served and heights as specified herein, and by distance of travel to exit, and the total required widths shall be equally divided among the required number.

Distance of travel to exit as specified in Table No. 403-G

may be increased by fifty (50) per cent in buildings of one-hour fire-resistive construction throughout, and by one-third (1/3) in buildings equipped with an approved automatic sprinkler system; except, only one (1) such increase shall be allowed.

403.092—Exitways

Exitways and units thereof shall be provided buildings of Group B occupancy and areas or portions and specified occupancy uses thereof, of such capacity, width and number as determined by occupant capacity of the building, tributary occupant loads, areas and heights and distance of travel to exit as provided in this Code and this section.

Reference: Section 401.092.

Exitways leading into or through kitchens or bakeries processing food for restaurants or public dining rooms, or through service, storage or hazardous areas or areas of distinct and individual occupancy or through guest rooms, shall not be included in the required number of exitways.

Arcades or corridors containing display windows or exits opening from sales rooms, display areas, shops or stores, shall not be less in width than two hundred (200) per cent of the required width of corridors based on tributary occupant loads.

403.093—Corridors

Corridors of buildings of Group B Occupancy shall be of such capacity and width as determined by the occupant capacity and tributary occupant loads of the building and areas or portions thereof, and shall be not less than forty-four (44) inches in width.

403.094—Stairways

Stairways of buildings of Group B Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than required for floor area per story for each stairway as specified in Table No. 404-H.

Stairways shall be not less than forty-four (44) inches in width; except, stairways serving areas of the building to which the public does not have access and a tributary occupant load of less than fifty (50) may be thirty-six (36) inches in width.

Buildings of two (2) or more stories in height shall be provided with not less than two (2) stairways accessible to all areas of the building.

Single family units and guest rooms shall have access to not less than two (2) stairways located a distance apart not

greater than twice the specified distance of travel to exit.

One (1) of the required stairways in a building of five (5) or more stories in height shall be a smokeproof tower of approved design and construction.

Reference: Chapter 705.

Table No. 403-H
Required Stairways based on Area per Story—Group B

Heights in Stories	Area per Story per Stairway in Sq. Ft. Type of Construction	
	I - II	III - IV - V
Not more than 2	7500	6750
Not more than 3	5000	4500
Not more than 6	4700	4200
Not more than 12	4400	
More than 12	4250	

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types I and II construction for each additional stairway over two (2).

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types III and IV construction of one-hour fire-resistive construction throughout.

Areas per story as specified for each stairway may be increased by one-third (1/3) in buildings of Types I, II, III and IV construction equipped with an approved automatic sprinkler system.

403.095—Doors and Doorways

Doorways of buildings of Group B Occupancy used as units of exitways shall be of such capacity and widths as determined by the occupant capacity and tributary occupant loads of the building and areas or portions and specified occupancy uses thereof.

Doors may be used in doorways as single or multiple units as necessary to gain required widths, and no single door shall be less than thirty-six (36) inches or more than fifty-four (54) inches in width; except, doors serving non-hazardous areas to which the public does not have access and of a tributary occupant capacity of less than ten (10) may be thirty (30) inches in width.

Doors of guest rooms opening into public corridors or of single family units opening into corridors may swing inward and shall be of Class C or of solid wood not less than one and three-quarters (1¾) inches in thickness.

Doors of kitchens, bakeries or service areas opening into

restaurants or public dining rooms shall be of Class C or of solid wood not less than one and three-quarters ($1\frac{3}{4}$) inches in thickness.

Doorways of public meeting or dining rooms located on other than the ground floor, shall open directly to an exit stairs, corridor, foyer, or exitway with direct access to a means of egress to the exterior of the building.

Required doorways of public rooms shall be arranged a distance apart equal to not less than one-fifth ($1/5$) of the perimeter of the room.

403.096—Exits to the Exterior

Exits to the exterior of buildings of Group B Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than specified herein.

1000 or more occupants Four (4) exits

500 to 999 occupants....Three (3) exits

10 to 499 occupants.....Two (2) exits

Exit doorways to the exterior shall be not less than seventy-two (72) inches in clear width exclusive of door framing and doors shall swing to the full width, and exits shall be not less in width than the total required widths of exitways discharging thereto.

The total required widths of exits to the exterior from the building and areas or portions thereof, shall be equally divided among the required number and, except, as provided in this Code, exits shall be not farther apart than twice the specified distance of travel to exit.

Exits to the exterior of single units of motels shall be not less than thirty-six (36) inches in width.

403.10—Vertical Openings

Vertical openings in buildings of Group B Occupancy shall be enclosed as provided in this Code and this section.

Reference: Section 401.10.

Stairways shall be enclosed above the second story.

403.11—Light, Ventilation and Sanitation

Buildings of Group B Occupancy and rooms or areas thereof, of human habitation or used by the public or as single family units for living, eating and sleeping purposes, shall have floors and ceilings of not less in area and height than specified herein and shall be provided with sanitation facilities, light and ventilation as specified in this section.

Reference: Section 401.11.

403.111—Ceiling Heights, Room Areas, Light and Ventilation

Minimum ceiling heights and floor areas of rooms and

specified areas and the required window area based on percentage of floor area and the percentage of window area required to open for ventilation shall be as provided in this subsection and in Table No. 403-I.

Table No. 403-I
Minimum Ceiling Heights, Room Area and Window Area
Group B

Occupancy Use	Ceiling Height feet	Floor Area sq. ft.	Window		Ventilating System Class
			Area %	Open-ing %	
Residential-units					
Living rooms	7½	100	12	50	I
Dining rooms	7½	100	12	50	I
Bedrooms	7½	100	12	50	I
Kitchens	7½	50	12	50	I
Bathrooms	7½	50	12	50	I
Hotels-					
Guest rooms	8	100	14	50	I
Public Dining	12	xxx	14	50	II
Lobbies	12	xxx	14	50	III
Public meeting rooms	16	xxx	14	50	III
Kitchens	12	xxx	xx	xx	ⓐIII
Dormitories	10		14	50	II

①Required

Artificial lighting and automatic ventilating systems may be substituted for natural light and ventilation, and ventilating systems shall be required as specified in Table No. 403-I, and where required or used in lieu of windows shall be of the class specified and as defined in this Code.

Reference: Section 411.111.

403.112—Sanitation Facilities

Buildings shall be provided with not less than one (1) toilet room on each floor for each sex and each toilet room shall contain not less than one (1) water closet and one (1) lavatory, and each building and area or portion of specified occupancy use thereof, shall have in addition not less than one (1) toilet room for each sex equipped as determined by the occupant capacity of the building or area as provided in Table No. 403-J.

Reference: Subsection 401.113.

Single family dwelling units shall be provided with a toilet room containing a water closet and bath tub or shower and each kitchen shall be provided with a sink.

Table No. 403-J

Required Equipment of Toilet Rooms—Group B

Number of Occupants	No. of Lavatories	No. of Water Closets		No. of Urinals Male
		Female	Male	
Less than 25	1	2	1	1
25 to 49	1	3	1	2
50 to 99	2	5	2	3
100 or over— each 30		1		
each 60	1		1	1

403.12—Heating Equipment and Installation

Heating units or apparatus generating heat, chimneys, boiler or furnace rooms and special appliances or equipment for heating buildings of Group B Occupancy shall be installed, located or constructed as provided in this Code and this section.

Reference: Section 401.12.

403.13—Storage and Special Hazards

Areas or portions of buildings of Group B Occupancy shall not be used for storage, service or special hazard use and such storage as is permitted shall be as provided in this Code.

Reference: Section 401.13.

Furniture, mattresses, bedding or repair materials shall not be stored in excess of requirements for current replacement or repair, and service areas for repair or refinishing of furnishings shall be separated from other areas by not less than two-hour fire-resistive construction.

Paints, lacquers or finishes and volatile liquids shall not be stored in quantities in excess of current maintenance requirements, and shall be stored in sealed containers and in rooms or areas separated from other areas by not less than two-hour fire-resistive construction.

The storage of film shall not be permitted.

403.14—Fire Protective Equipment

Fire protective equipment where required or installed in buildings of Group B Occupancy shall be of approved type and shall be installed as provided in this Code and this section.

Reference: Section 401.14.

Alarm systems shall be required in hotels or apartments used for sleeping purposes by twenty (20) or more occupants.

Reference: Chapter 715.

Interior wet standpipes shall be required in all buildings of three (3) or more stories in height.

403.15—Special Equipment

Special apparatus, equipment or appliances installed in buildings of Group B Occupancy and becoming an integral part or portion of the structure and affecting the occupants thereof, shall be installed, located or constructed as provided in this Code and this section and subsections.

Reference: Section 401.15.

CHAPTER 404
GROUP C
BUSINESS OCCUPANCY

404.01—Group C Occupancy Defined

Group C Occupancy shall include buildings or structures and areas or portions thereof, of business occupancy, and shall include:

Office Buildings**Retail Stores****Banks****Department Stores****Sales Rooms****Super Markets**

Reference: Subsection 401.016.

Reference: Chapter 401—General occupancy requirements.

404.02—Type of Construction

Buildings of Group C Occupancy may be of Types I, II, III, IV or V construction.

Reference: Article V.

Buildings of more than three thousand (3000) square feet in floor area per story above the second story or of four (4) or more stories in height shall be of not less than one-hour fire-resistive construction throughout; except, interior partitions of non-hazardous areas of separate and distinct business units or occupancies may be of less fire-resistive construction.

404.03—Fire District Requirements

Buildings of Group C Occupancy of Type V construction shall not be permitted within the Fire District.

Reference: Article III.

Buildings of Type IV construction shall be permitted in Fire Zone I for limited occupancies only and may be used as real estate, sales offices or similar occupancies where merchandise is not stocked or stored or as clinics, doctors or dental offices or medical and professional buildings used for consulting and non-hazardous purposes and housing no patients.

404.04—Design and Loading

Buildings of Group C Occupancy and areas or portions thereof of specified occupancy uses shall be designed for unit live loads of pounds per square foot of floor area as provided in this Code and this Section, and as specified in Table No. 404-A.

Reference: Chapter 601.

Unit live loads of occupancy uses not specified in this Section shall be determined on the basis of occupancies of similar character.

Floors of areas where partitions are subject to be re-

located shall be designed to support in addition to specified loads, a uniformly distributed load equal to twenty (20) pounds per square foot.

Table No. 404-A
Unit Live Loads—Group C

Occupancy Use	Pounds per sq. ft.
Balconies-	
Exterior	100
Interior—no seating or storage	40
Corridors and Aisles	100
Dining rooms—public	100
Foyers and lobbies	100
Loading docks	250
Marquees	60
Offices	50
Public rooms	100
Rest rooms	50
Restaurants	100
Sales rooms—retail	
Light merchandise	75
Heavy merchandise	125
Shipping rooms	150
Stairways and ramps	100
Storage-	
Light	125
Heavy	250
Stores—Retail	75
Vaults	125
Work rooms	75

Floors of areas used as offices shall be designed to support a load of two thousand (2000) pounds in any two and one-half (2½) foot square area.

404.05—Mixed Occupancy Separation

Buildings of Group C Occupancy and areas or portions thereof, shall be separated from specified areas and other occupancies of the same building by an occupancy separation of not less in hours of fire-resistive construction than specified in this section and in Table No. 404-B.

Reference: Subsection 401.053.

Table No. 404-B
Mixed Occupancy Separations—Group C

Group Occupancy	A	B	C	D	E	F	G	-H-		I	J	K	L	M
Separation in hours	1	1	x	1	2	3	2	3	2	1	4	2	4	1

Kitchens, bakeries and service areas supplying food to restaurants, dining rooms or for retail sales establishments, shall be separated from adjoining areas by not less than one-hour fire-resistive construction.

Workrooms, storage areas for merchandise and alteration or repair rooms of retail sales establishments shall be separated from sales or display areas by not less than one-hour fire-resistive construction.

Separate and distinct business units or occupancies shall be separated from each other and corridors or exitways of the building by not less than one-hour fire-resistive construction.

404.06—Allowable Floor Area

Buildings of Group C Occupancy shall not exceed the floor areas in square feet per story specified in this section and in Table No. 404-C.

Table No. 404-C
Allowable Floor Area—Group C

Type of Construction	I	II	III	IV	V
Fire Zone I	UL	7000	4200	1000	NP
II	UL	8000	4800	4500	NP
Outside Fire District	UL	9000	6000	6000	4200

Allowable floor areas as specified in Table No. 404-C may be increased as provided herein and in Table No. 404-D, and when applicable, increases in percentage of floor area per story as specified for limited heights, one-hour fire-resistive construction, automatic sprinkler system and excess exposure distances may be compounded; except, increases shall not be allowed for one-hour fire-resistive construction or

Table No. 404-D
Allowable Increases in Floor Area—Group C

Allowable Increases	No. Stor-ies	Percentage of Increase Type of Construction				
		I	II	III	IV	V
Limited Heights- not more than	3	UL	40	40	40	40
	2		75	75	75	75
One-hour Constr.-	x		50	50	50	
Sprinkler system- more than not more than	1		200	200	200	x
	1		300	300	300	x

Excess Exposure Distance—Reference: Subsection 401.062.

automatic sprinkler system where required by other provisions of this Code.

Allowable areas shall not be limited in buildings of not more than one (1) story in height, provided, the building is equipped with an approved automatic sprinkler system and exterior walls are not less than sixty (60) feet from adjacent property lines on one hundred (100) per cent of the perimeter of the building.

404.07—Limiting Heights

Buildings of Group C Occupancy shall not exceed the limiting heights in stories or the maximum height in feet specified in this section and in Table No. 404-E.

Table No. 404-E
Limiting Heights in Stories—Group C

Types of Construction	I	II	III	IV	V
Fire Zone I	UL	4	3	1	NP
II	UL	4	3	2	NP
Outside Fire District	UL	5	3	3	2
Maximum Ht. in Feet	UL	85	65	65	45

Limiting heights as specified in Table No. 404-E may be increased as provided herein; except, increases shall not be allowed for one-hour fire-resistive construction throughout or automatic sprinkler systems where required by other provisions of this Code, or when increases in area have been allowed for such construction or equipment.

Limiting heights may be increased by one (1) story, or fifteen (15) feet, in buildings of Types III, IV or V of one-hour fire-resistive construction throughout, or when equipped with an approved automatic sprinkler system.

404.08—Exterior Walls and Protection of Openings

Exterior bearing walls or portions of such walls and allowable openings therein, of buildings of Group C Occupancy located less than the specified exposure distance from adjacent property lines shall be of not less in fire-resistive construction than specified in this section and in Table No. 404-F.

Buildings shall face upon a yard, open space, court, street, or public way, such size and width to provide an exposure distance of not less than twenty (20) feet in the entire length of one (1) exterior wall, and such exposed exterior wall shall contain the main entrance and exit of the building at grade level.

404.09—Occupant Capacity and Exitways

The occupant capacity of buildings or structures of Group C Occupancy and areas or portions and specified occupancy

Table No. 404-E
Fire-Resistance of Exterior Bearing Walls
and Protection of Openings—Group C

Type of Const.	Exposure Distance in feet	Exterior Walls					
		Construction in hours			Protection of Openings in hours		
Fire Zones—		I	II	O	I	II	O
I	Less 4				NP	NP	NP
	Less 30		4	4			
	Less 50	4					
	Minimum	INC	INC	INC	1	1	1
II	Less 4				NP	NP	NP
	Minimum	4	4	4	1	1	1
III	Less 4				NP	NP	NP
	Less 8					1	1
	Less 20				1		
	Minimum	4	4	4			
IV	Less 4	4	4	4	NP	NP	NP
	Less 8						1
	Less 10	2		1		1	
	Less 20				1		
	Minimum	1	1				
V	Less 4			4			NP
	Less 8						1
	Less 10			1			

NP—Not Permitted. INC—Incombustible.

uses thereof, and the required number, width and capacity of exitways and units thereof, shall be as provided in this Code and as specified in this section and subsections.

Reference: Section 401.09.

Exitways shall include corridors, lobbies, foyers, arcades, aisles, stairs, ramps, landings, doors, vestibules, exits or other areas serving in whole or in part as a required means of exit travel to the exterior of the building, and exitways shall terminate upon a publicway, public alley or street, or upon a yard, court or open space with direct access to a publicway, public alley or street.

404.091—Occupant Capacity

The maximum occupant capacity of buildings of Group C Occupancy and areas or portions and specified occupancy uses thereof, and the capacity of exitways or corridors, stairways, doors and exits or units thereof, and the distance

of travel to exit, shall not exceed the capacity and distance specified in this Code and in Table No. 404-G.

Table No. 404-G
Maximum Occupant Capacity—Group C

Occupant Use	Occupant Capacity Sq. Ft. per Occupant	Travel to Exit (feet)	Number of Occupants per 22" Unit Width			
			Corridor	Exit Stairs	Exit Doors	Exits to exterior
Business:						
Office buildings	100	150	40	30	40	60
Offices	100	100	40	30	40	60
Banks	60	100	60	40	60	60
Department stores—						
ground floor	30	100	60		60	80
basement and upper floors	60	100	60	40	60	80
Retail stores	40	100	40	30	40	50
Sales rooms	40	100	40	30	40	50
Super markets	60	150	40	30	40	50
Business buildings—						
non-hazard	100	150	80	60	80	80
Maximum—						
non sprinkled		150				
sprinkled		200				
Minimum width in inches			60	44	36	72

Occupant capacity shall be determined and based upon specified square feet of area per occupant.

The aggregate total width of units of exitways shall be determined and based upon the specified number of occupants for each twenty-two (22) inches unit of width, and no single unit shall be less in width than the specified minimum in inches.

The number of exitways or units thereof, shall be determined and based upon square feet of area served and heights as specified herein, and by distance of travel to exit, and the total required widths shall be equally divided among the required number.

Distance of travel to exit as specified in Table No. 404-G may be increased by fifty (50) per cent in buildings of one-hour fire-resistive construction throughout, and by one-third ($\frac{1}{3}$) in buildings equipped with an approved automatic sprinkler system; except, only one (1) such increase shall be allowed.

404.092—Exitways

Exitways and units thereof, shall be provided buildings of Group C Occupancy of such capacity, width and number as shall be determined by the occupant capacity, tributary occupant loads, areas and heights and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, as provided in this Code and this section.

Exitways leading into or through kitchens or bakeries serving or processing foods for restaurants, public dining rooms or for retail or wholesale sales, or through service, storage or hazardous areas, or areas of distinct and individual occupancy, shall not be included in the required number of exitways.

Arcades or corridors containing display windows or exits opening from sales rooms, display areas, shops, stores or mercantile establishments shall be not less in width than two hundred (200) per cent of the required width of corridors based on occupant capacity and tributary occupant loads.

Aisles of mercantile establishments, shops, stores, department stores, display rooms, supermarkets, sales rooms or similar occupancies, serving as exitways shall be of required widths of open unobstructed area exclusive of sales counters, display racks or storage.

404.093—Corridors

Corridors of buildings of Group C Occupancy and aisles of sales or display areas serving as required exitways, shall be of such capacity and width as determined by the occupant capacity and tributary occupant loads of the building and areas or portions and specified occupancy uses thereof.

Corridors or aisles of buildings of Group C Occupancy shall be not less than sixty (60) inches in width; except, corridors serving areas of the building to which the public does not have access and of a tributary occupant load of less than fifty (50) may be forty (40) inches in width.

404.094—Stairways

Stairways of buildings of Group C Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than required for floor area per story for each stairway as specified in Table No. 404-H.

Stairways shall be not less than forty-four (44) inches in width; except, stairways serving areas of the building to which the public does not have access and a tributary occupant load of less than fifty (50) may be thirty-six (36) inches in width.

Table No. 404-H

Required Stairways based on Area per Story—Group C

Heights in Stories	Area per Story per Stairway in Sq. Ft. Type of Construction	
	I - II	III - IV - V
Not more than 2	9900	9000
Not more than 3	6600	6000
Not more than 6	6200	5600
Not more than 12	5800	
More than 12	5500	

Buildings of two (2) or more stories in height shall be provided with not less than two (2) stairways accessible to all areas of the building.

One (1) of the required stairways of buildings of three (3) or more stories in height shall be a smokeproof tower of approved design and construction.

Reference: Chapter 705.

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types I and II construction for each additional stairway over two (2).

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types III and IV construction of one-hour fire-resistive construction throughout.

Areas per story as specified for each stairway may be increased by one-third (1/3) in buildings of Types I, II, III and IV construction equipped with an approved automatic sprinkler system.

404.095—Doors and Doorways

Doorways of buildings of Group C Occupancy used as units of exitways shall be of such capacity and widths as determined by the occupant capacity and tributary occupant loads of the building and areas or portions and specified occupancy uses thereof.

Doors may be used in doorways either as single or multiple units as necessary to gain required widths, and no single door shall be less than thirty-six (36) inches or more than fifty-four (54) inches in width; except, doors serving non-hazardous areas to which the public does not have access and of a tributary occupant capacity of less than ten (10) may be thirty (30) inches in width.

Doors of kitchens or bakeries opening into public dining rooms, retail shops or areas to which the public has access, shall be of Class C or of solid wood not less than one and

three-quarters ($1\frac{3}{4}$) inches in thickness.

404.096—Exits to the Exterior

Exits to the exterior of buildings of Group C Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than specified herein.

1000 or more occupants Four (4) exits

500 to 999 occupants.....Three (3) exits

10 to 499 occupants.....Two (2) exits

Exit doorways to the exterior shall be not less than seventy-two (72) inches in clear width exclusive of door framing and doors shall swing to the full width, and exits shall be not less in width than the total required widths of exitways discharging thereto.

The total required widths of exits to the exterior from the building and areas or portions thereof, shall be equally divided among the required number and, except, as provided in this Code, exits shall be not farther apart than twice the specified distance of travel to exit.

404.10—Vertical Openings

Vertical openings in building of Group C Occupancy shall be enclosed as provided in this Code and this section.

Reference: Section 401.10.

Stairways shall be enclosed above the second story.

400.11—Light, Ventilation and Sanitation

Buildings of Group C Occupancy and rooms, areas or por-

Table No. 404-I

Minimum Ceiling Heights, Room Area and Window Area
Group C

Occupancy Use	Ceil- ing Height feet	Floor Area sq. ft.	Window		Venti- lating System Class
			Area %	Open- ing %	
Business- Offices	10	100	12	50	II
Banks	12	100	12	50	II
Sales rooms	12	100	12	50	II
Retail stores	10	100	12	50	II
Dept. stores-					
main floor	16		12	50	II
upper floors	12		12	50	II
Super markets	12		14	50	II

tions and specified occupancy uses thereof, accessible to the public and used for business purposes or as places of employment, shall have floors and ceilings of not less in area and height than specified herein and shall be provided with sanitation facilities, light and ventilation as specified in this section.

Reference: 401.11.

404.111—Ceiling Heights, Room Areas, Light and Ventilation

Minimum ceiling heights and floor areas of rooms and specified areas and required window area based on percentage of floor area and the percentage of window area required to open for ventilation shall be as provided in this subsection and in Table No. 404-I.

Artificial lighting and automatic ventilating systems may be substituted for natural light and ventilation, and ventilating systems shall be required as specified in Table No. 404-I and where required or used in lieu of windows shall be of the class specified and as defined in this Code.

Reference: Subsection 401.111.

404.112—Sanitation Facilities

Buildings shall be provided with not less than one (1) toilet room on each floor for each sex and each toilet room shall contain not less than one (1) water closet and one (1) lavatory, and each building and area or portion of specified occupancy use thereof, shall have in addition not less than one (1) toilet room for each sex equipped as determined by the occupant capacity of the building or area as provided in Table No. 404-J.

Reference: Subsection 401.112.

Table No. 404-J
Required Equipment of Toilet Rooms—Group C

Number of Occupants	No. of Lavatories	No. of Water Closets		No. of Urinals Male
		Female	Male	
Less than 25	1	2	1	1
25 to 49	1	3	1	2
50 to 99	2	5	2	3
100 or over— each 30		1		
each 60	1		1	1

404.12—Heating Equipment and Installation

Heating units or apparatus generating heat, chimneys, boiler or furnace rooms and special appliances or equipment for heating buildings of Group C Occupancy shall be installed, located or constructed as provided in this Code and

this section.

Reference: Section 401.12.

404.13—Storage and Special Hazards

Areas or portions of buildings of Group C Occupancy shall not be used for storage, service or special hazard use and such storage as is permitted shall be as provided in this Code.

Reference: Section 401.13.

Merchandise and supplies may be stored in quantities as required for current sales or operational uses.

Storage of paints, lacquers or finishes, and volatile liquids shall not be permitted.

Film may be stored in quantities required for current sales or service uses.

404.14—Fire Protective Equipment

Fire protective equipment where required or installed in buildings of Group C Occupancy shall be of approved type and shall be installed as provided in this Code and this section.

Reference: Section 401.14.

Alarm systems shall be required in department stores, shops or mercantile establishments and office buildings occupied by forty (40) or more above or below the ground floor or by twenty (20) or more occupants above the second story and below the first basement.

Interior wet standpipes shall be required in all buildings of three (3) or more stories in height.

404.15—Special Equipment

Special apparatus, equipment or appliances installed in buildings of Group C Occupancy and becoming an integral part or portion of the structure and affecting the occupants thereof, shall be installed, located or constructed as provided in this Code and this section and subsections.

Reference: Section 401.15.



CHAPTER 405

GROUP D

COMMERCIAL OCCUPANCY

405.01—Group D Occupancy Defined

Group D Occupancy shall include buildings or structures, and areas or portions thereof, of commercial occupancy, and shall include:

Bowling Alleys	Undertaking Parlors
Auto Sales Rooms	Storage Garages
Open Parking Decks	Aircraft Storage Hangars
Gasoline Service Stations	Billiard Parlors
Libraries	Auto Parts Sales Rooms
Wholesale Sales Rooms	Paint Stores (Without Bulk Storage)
Passenger Terminals	Fire Stations
Sales Rooms—Hazardous (No Storage)	Parking Lot Offices
Police Stations	Restaurants

Reference: Subsection 401.016.

Reference: Chapter 401—General occupancy requirements.

Police station detention rooms or cells shall be subject to provisions of this Code regulating Institutional Restrained Occupancy.

Reference: Chapter 407.

Open parking decks shall be constructed as provided in this Code and this Chapter.

Reference: Subsection 405.161.

405.02—Type of Construction

Buildings of Group D Occupancy may be of Types I, II, III, IV or V construction.

Reference: Article V.

Buildings of more than three thousand (3000) square feet in floor area per story above the second story or of four (4) or more stories in height shall be of not less than one-hour fire-resistive construction throughout; except, interior partitions of non-hazardous areas of separate and distinct commercial units or occupancies may be of less fire-resistive construction.

Detention, cellblock and security areas, normally kept locked for purposes of involuntary confinement of occupants, shall be of Types I or II construction, and such areas shall not be located below the first basement or above the third story in buildings of Type II construction.

405.03—Fire District Requirements

Buildings of Group D Occupancy of Type V construction shall not be permitted within the Fire District.

Reference: Article III.

Table No. 405-A
Unit Live Loads—Group D

Occupancy Use	Pounds per sq. ft.
Aircraft storage hangars	150
Assembly areas-	
Fixed seats	50
Movable seats	100
Auto and Machinery	
Sales rooms	100
Parts sales rooms	150
Balconies-	
Exterior	100
Interior—no seating or storage	40
Billiard parlors	100
Bowling alleys	100
Chapels	100
Corridors and aisles	100
Dining rooms—public	100
Display rooms—equipment and merchandise	
Light	100
Heavy	150
Fire stations	125
Fire station dormitories	50
Foyers and lobbies	100
Garages	100
Gasoline service stations	100
Libraries-	
Reading rooms	60
Stack rooms	125
Loading docks	250
Offices	50
Open parking decks	75
Passenger terminals	100
Police stations	100
Public rooms	100
Rest rooms	50
Restaurants	100
Sales rooms—wholesale	
Light merchandise	100
Heavy merchandise	150
Shipping rooms	150
Stairways and ramps	100
Storage-	
Light	125
Heavy	250
Work rooms	100

Buildings of Type IV construction shall be permitted in Fire Zone 1 for limited occupancies only and may be used as parking lot or sales offices and similar occupancies when merchandise is not stocked or stored or as gasoline service stations where no greasing, servicing or repairs are made on vehicles.

405.04—Design and Loading

Buildings of Group D Occupancy and areas or portions thereof of specified occupancy uses shall be designed for unit live loads of pounds per square foot of floor area as provided in this Code and this Section, and as specified in Table No. 405-A.

Reference: Chapter 601.

Unit live loads of occupancy uses not specified in this Section shall be determined on the basis of occupancies of similar character.

Floors of areas where partitions are subject to be re-located shall be designed to support in addition to specified loads, a uniformly distributed load equal to twenty (20) pounds per square foot.

Floors of areas subject to superimposed loads by installation of equipment or machinery, placing, displaying, or storage of material or merchandise, or movement of heavy or loaded vehicles shall be designed to support in all affected areas in addition to specified design loads one and one-half (1½) times the concentrated superimposed load, which of vehicles, trucks, buses or railroad equipment shall be the concentrated load of the heaviest loaded single wheel.

405.05—Mixed Occupancy Separation

Buildings of Group D Occupancy and areas or portions thereof, shall be separated from specified areas and other occupancies of the same building by an occupancy separation of not less in hours of fire-resistive construction than specified in this section and in Table No. 405-B.

Reference: Subsection 401.053.

Table No. 405-B
Mixed Occupancy Separations—Group D

Group Occupancy	-H-													
	A	B	C	D	E	F	G	1	2	I	J	K	L	M
Separation in hours	1	1	1	x	2	3	2	3	2	1	4	2	4	1

Kitchens, bakeries and service areas supplying food to restaurants, dining rooms and retail or wholesale sales or distribution establishments, shall be separated from adjoining areas by not less than one-hour fire-resistive construction.

Workrooms, storage areas of merchandise or products

and alteration repair or service areas shall be separated from sales or display areas by not less than one-hour fire-resistive construction.

Separate and distinct commercial units or occupancies sales or display areas by not less than one-hour fire-resistive of the building by not less than one-hour fire-resistive construction.

405.06—Allowable Floor Areas

Buildings of Group D Occupancy shall not exceed the floor areas in square feet per story specified in this Section and in Table No. 405-C.

Table No. 405-C
Allowable Floor Area—Group D

Type of Construction	I	II	III	IV	V
Fire Zone I	UL	7000	4500	1500	NP
II	UL	8000	4800	4500	NP
Outside Fire District	UL	9900	6600	6600	5100

Allowable floor areas as specified in Table No. 405-C may be increased as provided herein and in Table No. 405-D, and when applicable, increases in percentage of floor area per story as specified for limited heights, one-hour fire-resistive construction, automatic sprinkler system and excess exposure distances may be compounded; except, increases shall not be allowed for one-hour fire-resistive construction or automatic sprinkler systems where required by other provisions of this Code.

Table No. 405-D
Allowable Increases in Floor Area—Group D

Allowable Increases	No. Stories	Percentage of Increase Type of Construction				
		I	II	III	IV	V
Limited Heights- not more than	3	UL	40	40	40	40
	2		75	75	75	75
One-hour Contr.-	x		50	50	50	x
Sprinkler system- more than not more than	1		200	200	200	x
	1		300	300	300	x

Excess Exposure Distance—Reference: Subsection 401.062.

Allowable areas shall not be limited in buildings of not more than two (2) stories in height, provided, the building is equipped with an approved automatic sprinkler system and exterior walls are not less than sixty (60) feet from adjacent

property lines on one hundred (100) per cent of the perimeter of the building.

405.07—Limiting Heights

Buildings of Group D Occupancy shall not exceed the limiting heights in stories or the maximum height in feet specified in this section and in Table No. 405-E.

Table No. 405-E

Limiting Heights in Stories—Group D

Types of Construction	I	II	III	IV	V
Fire Zone I	UL	3	3	1	NP
II	UL	4	3	2	NP
Outside Fire District	UL	5	3	3	2
Maximum Ht. in Feet	UL	85	65	65	45

Limiting heights as specified in Table No. 405-E may be increased as provided herein; except, increases shall not be allowed for one-hour fire-resistive construction throughout or automatic sprinkler systems where required by other pro-

Table No. 405-F

Fire-Resistance of Exterior Bearing Walls and Protection of Openings—Group D

Type of Const.	Exposure Distance in feet	Exterior Walls					
		Construction in hours			Protection of Openings in hours		
Fire Zones—		I	II	O	I	II	O
I	Less 5				NP	NP	NP
	Less 30		4	4			
	Less 50	4					
	Minimum	INC	INC	INC	1	1	1
II	Less 5				NP	NP	NP
	Minimum	4	4	4	1	1	1
III	Less 5				NP	NP	NP
	Less 10					1	1
	Less 20				1		
	Minimum	4	4	4			
IV	Less 5	4	4	4	NP	NP	NP
	Less 10	2	2	1		1	1
	Less 20				1		
	Minimum	1	1				
V	Less 5			4			NP

NP—Not Permitted. INC—Incombustible.

visions of this Code, or when increases in area have been allowed for such construction or equipment.

Limiting heights may be increased by one (1) story or fifteen (15) feet, in buildings of Types II, III, IV or V of one-hour fire-resistive construction throughout, or when equipped with an approved automatic sprinkler system.

405.08—Exterior Walls and Protection of Openings

Exterior bearing walls or portions of such walls and allowable openings therein, of buildings of Group D Occupancy located less than the specified exposure distance from adjacent property lines shall be of not less in fire-resistive construction than specified in this section and in Table No. 405-F.

Buildings shall face upon a yard, openspace, court, or public way of such size and width to provide an exposure distance of not less than twenty (20) feet in the entire length of one (1) exterior wall, and such exposed exterior wall shall contain the main entrance and exit of the building at grade level.

405.09—Occupant Capacity and Exitways

The occupant capacity of buildings or structures of Group D Occupancy and areas or portions and specified occupancy uses thereof, and the required number, width and capacity of exitways and/or units thereof, shall be as provided in this Code and as specified in this section and subsections.

Reference: Section 401.09.

Exitways shall include corridors, lobbies, foyers, arcades, aisles, stairs, ramps, landings, doors, vestibules, exits or other areas serving in whole or in part as a required means of exit travel to the exterior of the building, and exitways shall terminate upon a publicway, public alley or street, or upon a yard, court or open space with direct access to a publicway, public alley or street.

405.091—Occupant Capacity

The maximum occupant capacity of buildings or structures of Group D Occupancy and areas or portions and specified occupancy uses thereof, and the capacity of exitways or corridors, stairways, doors and exits or units thereof, and the distance of travel to exit, shall not exceed the capacity and distance specified in this Code and in Table No. 405-G.

Occupant capacity shall be determined based upon specified square feet of area per occupant.

The aggregate total widths of exitways and units thereof, shall be determined based upon the specified number of occupants and tributary occupant load for each twenty-two (22) inch unit of width, and no single unit shall be less in width than the specified minimum in inches.

Table No. 405-G
Maximum Occupant Capacity—Group D

Occupant Use	Occupant Capacity Sq. Ft. per Occupant	Travel to Exit (feet)	Number of Occupants per 22" Unit Width			
			Corridor	Exit Stairs	Exit Doors	Exits to exterior
Commercial:						
Commercial buildings	100	150	40	30	40	50
Public buildings	100	150	40	30	40	50
Office buildings	100	150	40	30	40	60
Undertaking Estab.	60	100	40	30	40	50
Radio-TV stations	100	150	40	30	40	50
Sales rooms	40	100	40	30	40	50
Shops and stores	40	100	40	30	40	50
Restaurants— with dance floor	7	100	100	60	80	100
Passenger terminals	30	150	80	60	80	100
Bowling alleys	100	150	60	40	60	80
Billard parlors	100	150	60	40	60	80
Storage garages	400	150	60	40	60	80
Maximum—						
non sprinkled		150				
sprinkled		200				
Minimum width in inches			60	44	36	72

The number of exitways or units thereof, shall be determined based upon square feet of area served and heights as specified herein, and by distance of travel to exit, and the total required widths shall be equally divided among the required number.

Distance of travel to exit as specified in Table No. 405-G may be increased by fifty (50) per cent in buildings of one-hour fire-resistive construction throughout, and by one-third ($\frac{1}{3}$) in buildings equipped with an approved automatic sprinkler system; except, only one (1) such increase shall be allowed.

405.092—Exitways

Exitways and units thereof, shall be provided buildings of Group D Occupancy and areas or portions and specified occupancy uses thereof, of such capacity, width and number as shall be determined by the occupancy capacity of the building, tributary occupant loads, areas and heights and distance of travel to exit as provided in this Code and this section.

Reference: Section 401.092.

Exitways leading into or through kitchens or bakeries serving or processing food for restaurants, public dining rooms or for retail or wholesale sales, or through service, storage or hazardous areas, or areas of distinct and individual occupancy, shall not be included in the required number of exitways.

Aisles of mercantile establishment, storage areas, display rooms or similar occupancies, serving as exitways, shall be of required widths of open unobstructed area exclusive of sales counters, display racks or storage.

Required exitways of sales rooms, auction halls, restaurants or areas used by the public for assembly shall be arranged a distance apart equal to not less than one-fifth (1/5) of the perimeter of the area.

Fire corridors may be permitted as exitways in buildings of Group D Occupancy of Types I, II, or IV construction, and shall be of such construction and fire-resistance as provided in this Code.

405.093—Corridors

Corridors of buildings of Group D Occupancy and aisles of sales or display areas serving as required exitways, shall be of such capacity and width as determined by the occupant capacity and tributary occupant loads of the building and areas or portions thereof.

Corridors or aisles of Group D Occupancy shall be not less than sixty (60) inches in width; except, corridors serving areas to which the public does not have access and of a tributary occupant load of less than fifty (50) may be forty (40) inches in width.

405.094—Stairways

Stairways of buildings of Group D Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and speci-

Table No. 405-H

Required Stairways based on Area per Story—Group D

Heights in Stories	Area per Story per Stairway in Sq. Ft. Type of Construction	
	I - II	III - IV - V
Not more than 2	9900	9000
Not more than 3	6600	6000
Not more than 6	6200	5600
Not more than 12	5800	
More than 12	5500	

fied occupancy uses thereof, and shall be not less in number than required for floor area per story for each stairway as specified in Table No. 404-H.

Stairways shall be not less than forty-four (44) inches in width; except, stairways serving areas of the building to which the public does not have access and of a tributary occupant load of less than fifty (50) may be thirty-six (36) inches in width.

Buildings of two (2) or more stories in height shall be provided with not less than two (2) stairways accessible to all areas of the building.

One (1) of the required stairways of buildings of three (3) or more stories in height shall be a smokeproof tower of approved design and construction.

Reference: Chapter 705.

The required number of stairways serving areas of automobile storage garages to which the public does not have access may be reduced by fifty (50) per cent in buildings or structures equipped with a system of vehicle ramps, and one (1) required stairway may be replaced by an approved automatic lift device installed for transporting attendants only, and ramps shall discharge at the ground floor level not more than forty (40) feet or less than twenty (20) feet from an exit to the exterior of the building.

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types I and II construction for each additional stairway over two (2).

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types III and IV construction of one-hour fire-resistive construction throughout.

Areas per story as specified for each stairway may be increased by one-third ($\frac{1}{3}$) in buildings of Types I, II, III and IV construction equipped with an approved automatic sprinkler system.

405.095—Doors and Doorways

Doorways of buildings of Group D Occupancy used as units of exitways shall be of such capacity and widths as determined by the occupant capacity and tributary occupant loads of the building and areas or portions and specified occupancy uses thereof.

Doors may be used in doorways as single or multiple units as necessary to gain required widths, and no single door shall be less than thirty-six (36) inches or more than fifty-four (54) inches in width; except, doors serving non-hazardous areas to which the public does not have access and of a tributary occupant capacity of less than ten (10) may be thirty (30) inches in width.

Doors of kitchens or bakeries opening into public dining rooms or sales areas, and doors opening from service, storage or hazardous areas shall be of Class C or solid wood not less than one and three-quarters ($1\frac{3}{4}$) inches in thickness.

Doorways of public meeting or dining rooms located on other than the ground floor, shall open directly to an exit stairs, corridor, foyer, or exitway with direct access to a means of egress to the exterior of the building.

Required doorways of public rooms shall be arranged a distance apart equal to not less than one-fifth ($1/5$) of the perimeter of the room.

405.096—Exits to the Exterior

Exits to the exterior of buildings of Group D Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than specified herein.

1000 or more occupants Four (4) exits

500 to 999 occupants....Three (3) exits

10 to 499 occupants.....Two (2) exits

Exit doorways to the exterior shall be not less than seventy-two (72) inches in clear width exclusive of door framing and doors shall swing to the full width, and exits shall be not less in width than the total required widths of exitways discharging thereto.

The total required widths of exits to the exterior from the building and areas or portions thereof, shall be equally divided among the required number and, except, as provided in this Code, exits shall be not farther apart than twice the specified distance of travel to exit.

405.10—Vertical Openings

Vertical openings in buildings of group D Occupancy shall be enclosed as provided in this Code and this section.

Reference: Section 401.10.

Stairways leading from the ground floor to stories above or below in buildings of more than two (2) stories in height shall be enclosed; except, monumental stairs as provided in this Code.

405.11—Light, Ventilation and Sanitation

Buildings of Group D Occupancy and rooms, areas or portions and specified occupancy uses thereof, accessible to the public and used for commercial purposes or as places of employment, shall have floors and ceilings of not less in area and height than specified herein and shall be provided with sanitation facilities, light and ventilation as specified in this section.

Reference: Section 401.11.

405.111—Ceiling Heights, Room Areas, Light and Ventilation

Minimum ceiling heights and floor areas of rooms and specified areas and required window area based on percentage of floor area and the percentage of window area required to open for ventilation shall be as provided in this subsection and in Table No. 405-I.

Table No. 405-I**Minimum Ceiling Heights, Room Area and Window Area
Group D**

Occupancy Use	Ceiling Height feet	Floor Area sq. ft.	Window		Ventilating System Class
			Area %	Opening %	
Commercial-Bowling alleys	12		14	50	II
Auto sales rooms	12		12	50	II
Auto parts sales	10	100	12	50	I
Restaurants	12		14	50	II
Kitchens	12		xx	xx	①III
Auto storage garages	10		14	50	III
Passenger terminals	16		14	50	II
Sales rooms	12	100	12	50	II

①Required

Artificial lighting and automatic ventilating systems may be substituted for natural light and ventilation, and ventilating systems shall be required as specified in Table No. 405-I and where required or used in lieu of windows shall be of the class specified and as defined in this Code.

Reference: Subsection 401.111.

405.112—Sanitation Facilities

Buildings shall be provided with not less than one (1) toilet room on each floor for each sex and each toilet room shall contain not less than one (1) water closet and one (1) lavatory, and each building and area or portion of specified occupancy use thereof, shall have in addition not less than one (1) toilet room for each sex equipped as determined by the occupant capacity of the building or area as provided in Table No. 405-J.

Reference: Subsection 401.113.

405.12—Heating Equipment and Installation

Heating units or apparatus generating heat, chimneys,

Table No. 405-J
Required Equipment of Toilet Rooms—Group D

Number of Occupants	No. of Lavatories	No. of Water Closets		No. of Urinals Male
		Female	Male	
Less than 25	1	2	1	1
25 to 49	1	3	1	2
50 to 99	2	5	2	3
100 or over— each 30		1		
each 60	1		1	1

boiler or furnace rooms and special appliances or equipment for heating buildings of Group D Occupancy shall be installed, located or constructed as provided in this Code and this section.

Reference: Section 401.12.

405.13—Storage and Special Hazards

Areas or portions of buildings of Group D Occupancy shall not be used for storage, service or special hazard use and such storage as is permitted shall be as provided in this Code.

Reference: Section 401.13.

Merchandise may be stored in quantities as required for current sales uses.

Paints, lacquers or finishes, and volatile liquids may be stored in quantities required for current sales or service uses, and shall not be stored in bulk containers.

Film may be stored in quantities required for current sales or service uses.

405.14—Fire Protective Equipment

Fire protective equipment where required or installed in buildings of Group D Occupancy shall be of approved type and shall be installed as provided in this Code and this section.

Reference: Section 401.14.

Alarm systems shall be required in buildings occupied by forty (40) or more above or below the ground floor or by twenty (20) or more occupants above the second story and below the first basement, and in buildings of more than ten thousand (10,000) square feet of floor area per story.

Automatic Sprinkler systems shall be required in all areas of buildings occupied as film exchanges.

Interior wet standpipes shall be required in all buildings of three (3) or more stories in height.

405.15—Special Equipment

Special apparatus, equipment or appliances installed in buildings of Group D Occupancy and becoming an integral part or portion of the structure and affecting the occupants thereof, shall be installed, located or constructed as provided in this Code and this section and subsections.

Reference: Section 401.15.

405.16—Special Occupancies**405.161—Open Parking Decks****Occupancy Defined**

Open parking decks as defined herein, shall be structures of more than one story or tier in height and open fifty (50) per cent or more on two (2) or more exterior walls and used exclusively for parking or storage of passenger motor vehicles of a capacity of not more than nine (9) passengers per vehicle, and except as specified in this Chapter, shall be constructed as provided in this Code.

Type of Construction:

Structures shall be of Types I, II or IV and may be constructed in stories or in staggered tiers and shall be provided with ramps for movement of vehicles to or from stories or tiers.

Reference: Article V.

Fire District Requirements

Structures may be located within the Fire District, subject to requirements of this Subsection.

Design and Loading

Structures shall be designed for unit live loads of seventy-five (75) pounds per square foot of floor area; except, offices, waiting rooms and areas used by the public shall be designed for unit live loads as provided in this Chapter.

Reference: Section 405.04.

Mixed Occupancies

Areas of structures of open parking decks of the ground floor facing directly upon a street may be utilized for non-hazardous occupancies of Group C or D, provided no single business or commercial occupancy shall occupy an area greater than twenty-five hundred (2500) square feet and shall have required means of egress opening directly upon a street and shall be separated from all other areas by walls, floors and ceilings of not less than two-hour fire-resistive construction.

Areas of open parking decks used as offices, waiting rooms or by the public shall be located on the ground floor and open directly upon a street and shall be separated from other

areas by walls, floors and ceilings of not less than two-hour fire-resistive construction.

Areas and Heights

Structures shall not exceed the areas in square feet per story or tier, or the heights in stories, tiers or feet, specified in Table No. 405-C1; except, as provided herein for area and height increases.

Table No. 405-C1
Areas and Heights—Open Parking Decks

Type of Construction	Areas per Story or Tier	Heights		
		Stories	Tiers	Feet
I	UL	UL	UL	UL
II	45,000	6	7	85
IV—protected	40,000	5	6	75
IV—non-protected	25,000	3	4	45

Structures facing upon streets or with exposure distances from adjacent property lines of not less than sixty (60) feet on three (3) exterior walls or not less than sixty-five (65) per cent of the perimeter of the structure may increase areas by twenty-five (25) per cent and heights by one (1) story or tier, and structures facing upon streets or with exposure distances from adjacent property lines of not less than sixty (60) feet on four (4) exterior walls and one hundred (100) per cent of the perimeter of the structure may increase areas by fifty (50) per cent and heights by one (1) story or tier.

Exterior Walls and Protection of Openings

Exterior walls of structures shall face upon streets or publicways of not less than twenty (20) feet in width on not less than two (2) sides and not less than fifty (50) per cent of the perimeter of the structure, and such exterior walls shall be of not less than one-hour fire-resistive construction and shall be open on each story or tier not less than

Table No. 405-F1
Fire-resistance of Exterior Walls
and Percentage of Opening Open Parking Decks

Exposure Distance In Feet	Exterior Walls					
	Construction in hours			Area of Openings percentage		
	I	II	O	I	II	O
Fire Zones						
Less than 10	2	2	1	NP	NP	NP
10 to 20	2	1	1	NP	NP	50
More than 20	1	1	x	50	50	50

fifty (50) per cent of the area of the wall and required openings shall be equally distributed along the entire length of the wall.

Exterior walls adjoining adjacent property or other structures shall be of such fire-resistive construction and contain such openings as specified in Table No. 405-F1.

Required openings of exterior walls shall be protected by a curb or retaining wall designed to withstand possible impact load of vehicles.

Approved openings of exterior walls shall not be partially or completely closed by use of tarpaulins, canopies, screens, grills, obstructions or other means.

Occupant Capacity and Exitways

Ramps leading from each story or tier to the next above or below shall be employed in transporting vehicles under their own power, and automatic lifts or elevators shall not be permitted for such purpose in open parking decks.

Basements or areas below the ground floor shall not be occupied for parking or storage of vehicles.

Areas where persons other than parking attendants are permitted shall be provided with stairs and exitways based upon an occupant capacity of two hundred (200) square feet per occupant as required in this Chapter.

Reference: Section 405.09.

Structures shall be provided with not less than two (2) stairways of not less than thirty-six (36) inches in width leading from the uppermost story or tier to the ground floor and enclosed and constructed of incombustible materials, and required stairways shall be so located apart that distance of travel to stairway is equal from all areas of the structure.

Lifts may be provided parking attendants in addition to required stairways and shall be completely enclosed by incombustible construction.

Vertical Openings

Vertical openings, except required stairways or lifts, may be unenclosed and shall be protected at all floor levels by adequate curbs or retaining walls.

Light, Ventilation and Sanitation

Required and allowable openings of structures shall be deemed as sufficient ventilation.

Sanitation facilities shall be provided employees and areas used by the public as provided in this Chapter.

Reference: Section 405.11.

Fire Protective equipment

At each stair or lift opening on each tier or story there shall be provided a hand fire extinguisher of such size and

content as approved by the Fire Department.

Standpipes shall not be required.

Approved automatic sprinkler system shall be installed in all areas as provided in this Code.

Reference: Section 405.14.

Prohibited Uses

Open parking decks shall not be used for automobile repair work, sales and storage of gasolines or motor oils, greasing and servicing of vehicles, or parking and storage of buses, trucks or vehicles of a capacity of more than nine (9) passengers.

CHAPTER 406

GROUP E

INSTITUTIONAL OCCUPANCY

406.01—Group E Occupancy Defined

Group E Occupancy shall include buildings or structures and areas or portions thereof, of institutional or semi-educational occupancy of an occupant capacity of ten (10) or more and where occupants require specialized care or attention.

Reference: Subsection 401.016.

Reference: Chapter 401—General occupancy requirements.

Division E-1 shall include occupancies where activity of occupants is limited due to illness, disability or incapability, but is not restrained by involuntary confinement, and shall include:

Hospitals

Infirmaries

Sanatoriums

Homes for the Aged

Nursing Homes

Out-patient Clinics

Convalescent Homes

Division E-2 shall include occupancies used for the care of immature or pre-school aged children not included in Occupancy Group G and shall include:

Day Nurseries

Orphanages

Private Kindergartens

Boarding Schools

Quarters of Doctors or Nurses and dormitories or areas used in housing attendants may be constructed as provided for Occupancy Group B.

Reference: Chapter 403.

406.02—Type of Construction

Buildings of Group E Occupancy may be of Types I, II, III, IV or V construction.

Reference: Article V.

Buildings shall be of not less than one-hour fire-resistive construction throughout.

Bedridden patients or immature children shall not be housed above the first story in buildings of Types III, IV or V construction or above the second story in buildings of Type II construction.

406.03—Fire District Requirements

Buildings of Group E Occupancy of Types IV or V construction shall not be permitted in Fire Zone I, and of Type V construction shall not be permitted in Fire Zone II.

Reference: Article III.

406.04—Design and Loading

Buildings of Group E Occupancy and areas or portions thereof of specified occupancy uses shall be designed for

unit live loads of pounds per square foot of floor area as provided in this Code and this Section, and as specified in Table No. 406-A.

Reference: Chapter 601.

Table No. 406-A
Unit Live Loads—Group E

Occupancy Use	Pounds per sq. ft.
Balconies-	
Exterior	
Interior—no seating	100
Chapels	40
	100
Corridors-	
Private	
Public	40
Classrooms	100
Dining rooms—private	50
	60
Dormitories	
Foyers and lobbies	50
Hospitals-	100
Rooms	
Wards	40
Laboratories and surgical rooms	50
	75
Loading docks	
Marquees	250
Offices	60
Public rooms	50
Rest rooms	100
	50
Shipping rooms	
Stairways and ramps	150
Storage-	100
Light	
	125

Unit live loads of occupancy uses not specified in this Section shall be determined on the basis of occupancies of similar character.

406.05—Mixed Occupancy Separation

Buildings of Group E Occupancy and areas or portions thereof, shall be separated from specified areas and other occupancies of the same building by an occupancy separation of not less in hours of fire-resistive construction than specified in this section and in Table No. 406-B.

Reference: Subsection 401.053.

Kitchens, bakeries and service areas supplying food to occupants, cafeterias or dining rooms shall be separated from adjoining areas by not less than one-hour fire-resistive construction.

Surgical, operating or delivery rooms and x-ray or laboratory areas of hospitals shall be separated from adjoining areas by not less than three-hour fire-resistive construction.

Table No. 406-B
Mixed Occupancy Separations—Group E

Group Occupancy	-H-													
	A	B	C	D	E	F	G	1	2	I	J	K	L	M
Separation in hours	2	2	2	2	x	3	2	3	2	2	4	2	4	2

Nursery rooms, consultation, clinics or receiving areas of hospitals shall be separated from adjoining areas by not less than two-hour fire-resistive construction.

406.06—Allowable Floor Area

Buildings of Group E Occupancy shall not exceed the floor areas in square feet per story specified in this section and in Table No. 406-C.

Table No. 406-C
Allowable Floor Area—Group E

Type of Construction	I	II	III	IV	V
Fire Zone I	UL	3000	1800	NP	NP
II	UL	3500	2000	2700	NP
Outside Fire District	UL	4200	2500	3000	1500

Allowable floor areas as specified in Table No. 406-C may be increased as provided herein and in Table No. 406-D, and when applicable, increases in percentage of floor area per story as specified for limited heights, automatic sprinkler system and excess exposure distances may be compounded; except, increases shall not be allowed for automatic sprinkler system where required by other provisions of this Code.

Table No. 406-D
Allowable Increases in Floor Area—Group E

Allowable Increases	No. Stor- ies	Percentage of Increase Type of Construction				
		I	II	III	IV	V
Limited Heights- not more than	3	UL	40	40	40	x
	2		75	75	75	75
Sprinkler system- more than	1		200	200	200	x
	1		300	300	300	x

Excess Exposure Distance—Reference: Subsection 401.062.

406.07—Limiting Heights

Buildings of Group E Occupancy shall not exceed the limiting heights in stories or the maximum height in feet specified in this section and in Table No. 406-E.

Table No. 406-E
Limiting Heights in Stories—Group E

Types of Construction	I	II	III	IV	V
Fire Zone I	UL	2	1	NP	NP
II	UL	2	1	1	NP
Outside Fire District	UL	3	2	1	1
Maximum Ht. in Feet	UL	65	45	30	30

Limiting heights as specified in Table No. 406-E may be increased as provided herein; except, increases shall not be allowed for automatic sprinkler systems where required by

Table No. 406-F
and Protection of Openings—Group E
Fire-Resistance of Exterior Bearing Walls

Type of Const.	Exposure Distance in feet	Exterior Walls					
		Construction in hours			Protection of Openings in hours		
Fire Zones—		I	II	O	I	II	O
I	Less 5				NP	NP	NP
	Less 30		4	4			
	Less 50	4					
	Minimum	INC	INC	INC	1	1	1
II	Less 5				NP	NP	NP
	Minimum	4	4	4	1	1	1
III	Less 5				NP	NP	NP
	Less 10					1	1
	Less 20				1		
	Less 30				1		
	Minimum	4	4	4			
IV	Less 5		4	4		NP	NP
	Less 10		2			1	1
	Minimum		1	1			
V	Less 5			4			NP
	Less 10						1
	Minimum			1			

NP—Not Permitted. INC—Incombustible.

other provisions of this Code, or when increases in area have been allowed for such equipment.

Limiting heights may be increased by one (1) story, or fifteen (15) feet, in buildings of Types II, III, IV or V construction equipped with an approved automatic sprinkler system.

406.08—Exterior Walls and Protection of Openings

Exterior bearing walls or portions of such walls and allowable openings therein, of buildings of Group E Occupancy located less than the specified exposure distance from adjacent property lines shall be of not less in fire-resistive construction than specified in this section and in Table No. 406-F.

Buildings shall face upon a street or public way of such size and width to provide an exposure distance of not less than twenty (20) feet in the entire length of one (1) exterior wall, and such exposed exterior wall shall contain the main entrance and exit of the building at grade level.

406.09—Occupant Capacity and Exitways

The occupant capacity of buildings or structures of Group E Occupancy and areas or portions and specified occupancy uses thereof, and the required number, width and capacity of exitways and units thereof, shall be as provided in this Code and as specified in this section and subsections.

Reference: Section 401.09.

Exitways shall include corridors, lobbies, foyers, arcades, aisles, stairs, ramps, landings, doors, vestibules, exits or other areas serving in whole or in part as a required means of exit travel to the exterior of the building, and exitways shall terminate upon a publicway, public alley or street, or upon a yard, court or open space with direct access to a publicway, public alley or street.

406.091—Occupant Capacity

The maximum occupant capacity of buildings or structures of Group E Occupancy and areas or portions and specified occupancy uses thereof, and the capacity of exitways or corridors, stairways, doors and exits or units thereof, and the distance of travel to exit, shall not exceed the capacity and distance specified in this Code and in Table No. 406-G.

Occupant capacity shall be determined based upon specified square feet of area per occupant.

The aggregate total widths of exitways and units thereof, shall be determined based upon the specified number of occupants and tributary occupant load for each twenty-two (22) inch unit of width, and no single unit shall be less in width than the specified minimum in inches.

The number of exitways or units thereof, shall be deter-

mined based upon square feet of area served and heights as specified herein, and by distance of travel to exit, and the total required widths shall be equally divided among the required number.

Distance of travel to exit as specified in Table No. 406-G may be increased by fifty (50) per cent in buildings of one-hour fire-resistive construction throughout, and by one-third ($\frac{1}{3}$) in buildings equipped with an approved automatic sprinkler system; except, only one (1) such increase shall be allowed.

Table No. 406-G
Maximum Occupant Capacity—Group E

Occupant Use	Occu- pant Capac- ity [Sq. Ft. per Occu- pant]	Trav- el to Exit (feet)	Number of Occupants per 22" Unit Width			
			Cor- ridor	Exit Stairs	Exit Doors	Exits to ex- terior
Institutional:						
Hospital—						
Lobbies	25	100	40	30	40	60
Rooms	125	100	40	30	40	60
Wards	100	100	40	30	40	60
Dining rooms	20	100	40	30	40	60
Infirmarys	100	100	40	30	40	50
Sanitariums	150	100	40	30	40	50
Homes for aged	150	100	40	30	40	50
Nursing homes	150	100	40	30	40	50
Convalescent homes	150	100	40	30	40	50
Day nurseries	150	60	40	30	40	50
Orphanages—						
Dormitories	100	100	40	30	40	50
Dining rooms	15	100	40	30	40	50
Boarding schools—						
Dormitories	100	100	40	30	40	50
Dining room	15	100	40	30	40	50
Classrooms	16	50	40	30	40	50
Isolation areas	100	100	40	30	40	50
Maximum—						
Non-sprinkled		100				
sprinkled		133				
Minimum width in inches			72	60	60	72

406.092—Exitways

Exitways and units thereof, shall be provided buildings of Group E Occupancy and areas or portions and specified oc-

cupancy uses thereof, of such capacity, width and number as shall be determined by the occupancy capacity of the building, tributary occupant loads, areas and heights and distance of travel to exit as provided in this Code and this section.

Reference: Section 401.092.

Exitways leading into or through kitchens or bakeries supplying food for dining rooms or occupants or through service, storage or hazardous areas shall not be included in the required number of exitways.

406.093—Corridors

Corridors of buildings of Group E Occupancy shall be of such capacity and width as determined by the occupant capacity and tributary occupant load of the building and areas or portions thereof, and shall be not less than seventy-two (72) inches in width.

406.094—Stairways

Stairways of buildings of Group E Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than required for floor area per story for each stairway as specified in Table No. 406-H.

Table No. 406-H

Required Stairways based on Area per Story—Group E

Heights in Stories	Area per Story per Stairway in Sq. Ft. Type of Construction	
	I - II	III - IV - V
Not more than 2	6600	6000
Not more than 3	4400	4000
Not more than 6	4100	
Not more than 12	3850	
More than 12	3450	

Stairways shall be not less than sixty (60) inches in width; except, stairways serving areas of the building to which the public does not have access and a tributary occupant load of less than fifty (50) may be thirty-six (36) inches in width.

Buildings of two (2) or more stories in height shall be provided with not less than two (2) stairways accessible to all areas of the building.

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types I and II

construction for each additional stairway over two (2).

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types III and IV construction of one-hour fire-resistive construction throughout.

Areas per story as specified for each stairway may be increased by one-third ($\frac{1}{3}$) in buildings of Types I, II, III and IV construction equipped with an approved automatic sprinkler system.

One (1) of the required stairways of buildings of two (2) or more stories in height shall be a smokeproof tower of approved design and construction.

Reference: Chapter 705.

Ramps with a slope not greater than one (1) in eight (8) and not less than sixty (60) inches in width shall be substituted for not less than one (1) of the required stairways from all areas above the ground floor occupied by bedridden patients or immature children, and such ramp shall lead directly to the exterior of the building at grade level.

406.095—Doors and Doorways

Doorways of buildings of Group E Occupancy used as units of exitways shall be of such capacity and widths as determined by the occupant capacity and tributary occupant loads of the building and areas or portions and specified occupancy uses thereof.

Doors may be used in doorways as single or multiple units as necessary to gain required widths, and no single door shall be less than thirty-six (36) inches or more than fifty-four (54) inches in width; except, doors serving non-hazardous areas to which the public does not have access and of a tributary occupant capacity of less than ten (10) may be thirty (30) inches in width.

Doors to rooms or wards of hospitals and used in housing bedridden or incapacitated patients may swing inward and shall be of not less than fifty-four (54) inches in width and shall be of Class C or solid wood not less than one and three-quarters ($1\frac{3}{4}$) inches in thickness.

Doors of kitchens, bakeries, or service areas opening into dining rooms or other areas used by occupants shall be of Class C or of solid wood not less than one and three-quarters ($1\frac{3}{4}$) inches in thickness.

Required exit doors of dining or assembly areas and dormitories or wards shall be arranged a distance apart equal to not less than one-fifth ($1/5$) of the perimeter of the room.

406.096—Exits to the Exterior

Exits to the exterior of buildings of Group E Occupancy shall be of such capacity, width and number as determined

by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than specified herein.

1000 or more occupants Four (4) exits

500 to 999 occupants....Three (3) exits

10 to 499 occupants.....Two (2) exits

Exit doorways to the exterior shall be not less than seventy-two (72) inches in clear width exclusive of door framing and doors shall swing to the full width, and exits shall be not less in width than the total required widths of exitways discharging thereto.

The total required widths of exits to the exterior from the building and areas or portions thereof, shall be equally divided among the required number and, except, as provided in this Code, exits shall be not farther apart than twice the specified distance of travel to exit.

406.10—Vertical Openings

Vertical openings in buildings of Group E Occupancy shall be enclosed as provided in this Code and this section.

Reference: Section 401.10.

Stairways leading from the ground floor to stories above or below in buildings of more than two (2) stories in height shall be enclosed; except monumental stairs as provided in this Code.

406.11—Light, Ventilation and Sanitation

Buildings of Group E Occupancy and rooms, areas or portions and specified occupancy uses thereof, accessible to the public and used for the care or housing of patients or for institutional and educational purposes, shall have floors and ceilings of not less in area and height than specified herein and shall be provided with sanitation facilities, light and ventilation as specified in this section.

Reference: Section 401.11.

406.111—Ceiling Heights, Room Areas, Light and Ventilation

Minimum ceiling heights and floor areas of rooms and specified areas and required window area based on percentage of floor area and the percentage of window area required to open for ventilation shall be as provided in this subsection and in Table No. 406-I.

Artificial lighting and automatic ventilating systems may be substituted for natural light and ventilation, and ventilating systems shall be required as specified in Table No. 406-I and where required or used in lieu of windows shall be of the class specified and as defined in this Code.

Reference: Subsection 401.111.

Table No. 406-I
Minimum Ceiling Heights, Room Area and Window Area
Group E

Occupancy Use	Ceiling Height feet	Floor Area sq. ft.	Window		Ventilating System Class
			Area %	Opening %	
Institutional-Hospitals-					
Patient rooms	8	100	12	50	II
Wards	10	②100	12	50	II
Kitchens	12		xx	xx	①III
Surgical rooms	12				II
Schools or Orphanages-					
Classrooms	12		14	50	II
Dormitories	10	②100	14	50	II
Dining rooms	12		14	50	I
Play rooms	10		12	50	II
Kitchens	12		xx	xx	①III
Convalescence Homes-					
Guest rooms	8	100	12	50	I
Dining rooms	12		14	50	II
Dormitories	10	②100	14	50	II
Day rooms	12		14	50	II
Kitchens	12		xx	xx	①III
Clinics	12	100	12	50	II

①Required ②Per Occupant

406.112—Sanitation Facilities

Buildings shall be provided with not less than one (1)

Table No. 406-J
Required Equipment of Toilet Rooms—Group E

Number of Occupants	No. of Lavatories	No. of Water Closets		No. of Urinals Male
		Female	Male	
Less than 25	2	2	1	2
25 to 49	2	4	3	4
50 to 99	4	6	4	5
100 or over- each 30		1		
each 60	1		1	1

toilet room on each floor for each sex and each toilet room shall contain not less than one (1) water closet and one (1) lavatory, and each building and area or portion of specified occupancy use thereof, shall have in addition not less than one (1) toilet room for each sex equipped as determined by the occupant capacity of the building or area as provided in Table No. 406-J.

Reference: Subsection 401.113.

406.12—Heating Equipment and Installation

Heating units or apparatus generating heat, chimneys, boiler or furnace rooms and special appliances or equipment for heating buildings of Group E Occupancy shall be installed, located or constructed as provided in this Code and this section.

Reference: Section 401.12.

406.13—Storage and Special Hazards

Areas or portions of buildings of Group E Occupancy shall not be used for storage, service or special hazard use.

Reference: Section 401.13.

Combustible or explosive materials or products required for surgical, medical or laboratory uses shall be stored in rooms or areas separated from other areas by not less than three-hour fire-resistive construction.

406.14—Fire Protective Equipment

Fire protective equipment where required or installed in buildings of Group E Occupancy shall be of approved type and shall be installed as provided in this Code and this section.

Reference: Section 401.14.

Alarm systems shall be required in all buildings of more than one (1) story in height or of more than ten thousand (10,000) square feet of floor area per story.

Reference: Chapter 715.

Automatic sprinkler systems shall be required in all floored attic spaces.

Interior wet standpipes shall be required in all buildings of three (3) or more stories in height.

406.15—Special Equipment

Special apparatus, equipment or appliances installed in buildings of Group E Occupancy and becoming an integral part or portion of the structure and affecting the occupants thereof, shall be installed, located or constructed as provided in this Code and this section and subsections.

Reference: Section 401.15.



CHAPTER 407
GROUP F
INSTITUTIONAL OCCUPANCY
Restrained

407.01—Group F Occupancy Defined

Group F Occupancy shall include buildings or structures and areas or portions thereof, of institutional occupancy, where activity of occupants is restrained or controlled by involuntary confinement to security areas normally kept locked and shall include:

Asylums**Mental Hospitals****Jails****Prisons****Reformatories****Police Detention Rooms****Reference: Subsection 401.016.****Reference: Chapter 401—General occupancy requirements.**

Buildings or structures and portions thereof, used in connection with Group F Occupancy and where activity of the occupant is restrained or controlled by involuntary confinement to security areas normally kept locked, shall be constructed as provided in this Code for Group L, Hazardous Occupancy, and as provided in this Chapter, and in event of conflict the more restrictive provision shall apply and shall include:

Shops**Manufacturing Plants****Mills****Processing Plants****Warehouses****Garages****Reference: Chapter 413.**

Provisions of this Chapter shall not be construed as prohibiting necessary security measures in confining of occupants; except, buildings or portions thereof used for such purposes shall have adequate means of egress to the exterior of the building and no portion or area housing more than six (6) occupants shall have less than two (2) such means of egress.

407.02—Types of Construction

Buildings of Group F Occupancy shall be of Types I or II construction.

Reference: Article V.

Buildings shall be of not less than one-hour fire-resistive construction throughout.

Security areas shall be of not less than three-hour fire-resistive construction, and floors, platforms and stairs of security areas shall be constructed of incombustible material.

Bedridden or incapacitated patients or inmates shall not

be housed above the second story in buildings of Type II construction.

407.03—Fire District Requirements

Buildings of Group F Occupancy shall not be restricted as to location within the Fire District; except, Mental Hospitals or Asylums shall not be located within Fire Zone I. Reference: Article III.

407.04—Design and Loading

Buildings of Group F Occupancy and areas or portions thereof of specified occupancy uses shall be designed for unit live load of pounds per square foot of floor area as provided in this Code and this Section, and as specified in Table No. 407-A.

Reference: Chapter 601.

Table No. 407-A
Unit Live Loads—Group F

Occupancy Use	Pounds per sq. ft.
Balconies-	
Exterior	100
Interior—no seating or storage	40
Cellblocks	50
Chapels	100
Cellblock balconies	75
Corridors	100
Day or Exercise rooms	60
Dining rooms	100
Dormitories	50
Foyers—lobbies	100
Hospitals or Infirmaries-	
Rooms	40
Wards	50
Laboratories and surgical rooms	75
Libraries-	
Reading rooms	60
Stack rooms	125
Loading docks	250
Offices	50
Rest rooms	50
Shipping rooms	150
Stairways and ramps	100

Unit live loads of occupancy uses not specified in this Section shall be determined on the basis of occupancies of similar character.

407.05—Mixed Occupancy Separation

Buildings of Group F Occupancy and areas or portions

thereof, shall be separated from specified areas and other occupancies of the same building by an occupancy separation of not less in hours of fire-resistive construction than specified in this section and in Table No. 407-B.

Reference: Subsection 401.053.

Table No. 407-B
Mixed Occupancy Separations—Group F

Group Occupancy	A	B	C	D	E	F	G	-H-		I	J	K	L	M
Separation in hours	3	3	3	3	3	x	3	3	3	3	4	3	4	3

Security areas or portions shall be separated from non-security and other areas by not less than three-hour fire-resistive construction.

Kitchens, bakeries, service areas, dining rooms, visitors or interrogation rooms, laundries, tailor shops, and receiving or discharge areas shall be separated from each other and from other security areas by not less than three-hours fire-resistive construction; except, separation between adjoining kitchens and dining areas may be of two-hour fire-resistive construction.

Hospital or infirmary areas shall be separated from other areas by not less than three-hour fire-resistive construction.

Assembly areas or chapels shall be separated from adjoining and security areas by not less than three-hours fire-resistive construction and stages or motion picture booths shall be separated from security areas by not less than four-hours fire-resistive construction, and shall be constructed as provided in this Code.

Reference: Chapter 409.

407.06—Allowable Floor Area

Buildings of Group F Occupancy shall not exceed the floor areas in square feet per story specified in this section and in Table No. 407-C.

Table No. 407-C
Allowable Floor Area—Group F

Type of Construction	I	II	III	IV	V
Fire Zone I	UL	3000	NP	NP	NP
II	UL	3500	NP	NP	NP
Outside Fire District	UL	4200	NP	NP	NP

Allowable floor areas as specified in Table No. 407-C may be increased as provided herein and in Table No. 407-D, and when applicable, increases in percentage of floor area per story as specified for limited heights, automatic sprinkler system and excess exposure distances may be compounded;

except, increases shall not be allowed for automatic sprinkler system where required by other provisions of this Code

Table No. 407-D

Allowable Increases in Floor Area—Group F

Allowable Increases	No. Stor-ies	Percentage of Increase Type of Construction				
		I	II	III	IV	V
Limited Heights- not more than	3	UL	40	NP	NP	NP
	2		75			
Sprinkler system- more than not more than	1		200			
	1		300			

Excess Exposure Distance—Reference: Subsection 401.062.

407.07—Limiting Heights

Buildings of Group F Occupancy shall not exceed the limiting heights in stories or the maximum height in feet specified in this section and in Table 407-E.

Table No. 407-E

Limiting Heights in Stories—Group F

Types of Construction	I	II	III	IV	V
Fire Zone I	UL	2	NP	NP	NP
II	UL	2	NP	NP	NP
Outside Fire District	UL	3	NP	NP	NP
Maximum Ht. in Feet	UL	65	NP	NP	NP

Limiting heights as specified in Table No. 407-E may be increased as provided herein; except, increases shall not be allowed for automatic sprinkler systems where required by other provisions of this Code, or when increases in area have been allowed for such equipment.

Limiting heights of buildings of Type II construction may be increased by one (1) story or fifteen (15) feet when equipped with an approved automatic sprinkler system.

407.08—Exterior Walls and Protection of Openings

Exterior bearing walls or portions of such walls and allowable openings therein, of buildings of Group F Occupancy located less than the specified exposure distance from adjacent property lines shall be of not less in fire-resistive construction than specified in this section and in Table No. 407-F.

Buildings shall face upon a yard, open space, court, street, or public way of such size and width to provide an exposure

distance of not less than twenty (20) feet in the entire length of one (1) exterior wall, and such exposed exterior wall shall contain the main entrance and exit of the building at grade level.

Table No. 407-E
Fire-Resistance of Exterior Bearing Walls
and Protection of Openings—Group F

Type of Const.	Exposure Distance in feet	Exterior Walls					
		Construction in hours			Protection of Openings in hours		
Fire Zones—		I	II	O	I	II	O
I	Less 5				NP	NP	NP
	Less 30		4	4			
	Less 50	4					
	Minimum	INC	INC	INC	1	1	1
II	Less 5				NP	NP	NP
	Minimum	4	4	4	1	1	1

NP—Not Permitted. INC—Incombustible.

Exterior walls of security areas containing no opening therein shall not be required to be equipped with access panels and shall not be subject to provisions of Subsection 401.082.

407.09—Occupant Capacity and Exitways

The occupant capacity of buildings or structures of Group F Occupancy and areas or portions and specified occupancy uses thereof, and the required number, width and capacity of exitways or units thereof, shall be as provided in this Code and as specified in this section and subsections.

Reference: Section 401.09.

Exitways shall include corridors, lobbies, foyers, arcades, aisles, stairs, ramps, landings, doors, vestibules, exits or other areas serving in whole or in part as a required means of exit travel to the exterior of the building, and exitways shall terminate upon a publicway, public alley or street, or upon a yard, court or open space.

407.091—Occupant Capacity

The maximum occupant capacity of buildings or structures of Group F Occupancy and areas or portions and specified occupancy uses thereof, and the capacity of exitways or corridors, stairways, doors and exits or units thereof, and the distance of travel to exit, shall not exceed the capacity and distance specified in this Code and in Table No. 407-G.

407.092—Exitways

Table No. 407-F
Maximum Occupant Capacity—Group F

Occupant Use	Occu- pant Capac- ity Sq. Ft. per Occu- pant	Trav- el to Exit (feet)	Number of Occupants per 22" Unit Width			
			Cor- ridor	Exit Stairs	Exit Doors	Exits to ex- terior
Institutional:						
Penal institutions	125	150	40	30	40	50
Mental institutions	125	150	40	30	40	50
Dining rooms	15	150	40	30	40	50
Dormitories	100	150	40	30	40	50
Exercise rooms	80	100	40	30	40	50
Day rooms	80	100	40	30	40	50
Cell blocks	80	150	60	40	60	80
Infirmatories—	100	100	40	30	40	50
wards	100	150	40	30	40	50
Isolation areas	80	150	40	30	40	50
Minimum width in inches			72	44	36	72

Exitways and units thereof, shall be provided buildings of Group F Occupancy and areas or portions and specified occupancy uses thereof, of such capacity, width and number as determined by the occupant capacity of the building, tributary occupant loads, areas and heights and distance of travel to exit as provided in this Code and this Section.

Exitways leading into or through kitchens or bakeries supplying food for dining rooms or occupants, or through service, storage or hazardous areas shall not be included in the required number of exitways.

Areas or portions used as a hospital, infirmary, or surgical operating room and housing bedridden or incapacitated patients shall have access to not less than two (2) exitways to the exterior of the building and one (1) shall be a ramp of not less than sixty (60) inches in width and of a slope not greater than one (1) in eight (8) and leading directly to the exterior of the building at grade level.

Exitways of security areas discharging to the exterior of the buildings shall open directly upon a court, yard or area of sufficient width to allow occupants clearance from the building of not less than twice the height of the exterior wall or shall discharge upon a passageway leading to such a court or area.

Exitways of areas to which the public has access discharging to the exterior of the building shall open directly upon a street or public way or upon a court or yard not less in width than the total required widths of exitways discharging

thereupon and not less than four (4) feet and directly connected to a street or public way by a passageway not less in width than the required width of the court or yard and not less than seven (7) feet in height with no obstructions.

407.093—Corridors

Corridors of buildings of Group F Occupancy shall be of such capacity and width has determined by the occupant capacity and tributary occupant loads of the building and areas or portions thereof.

Corridors of buildings of Group F Occupancy shall not be less than seventy-two (72) inches in width.

Open balconies of security areas serving cellblocks as a means of egress shall be considered corridors and shall be not less in width than one and one-half ($1\frac{1}{2}$) times the widths of doors of cells opening thereon and not less than fifty-four (54) inches in width, and there shall be not less than two (2) stairways serving such balconies of an occupant capacity of ten (10) or more.

407.094—Stairways

Stairways of buildings of Group F Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than required for floor area per story for each stairway as specified in Table No. 407-H.

Table No. 407-H

Required Stairways based on Area per Story—Group F

Heights in Stories	Area per Story per Stairway in Sq. Ft. Type of Construction	
	I - II	
Not more than 2	6600	
Not more than 3	4400	
Not more than 6	4100	
Not more than 12	3850	
More than 12	3450	

Stairways shall be not less than forty-four (44) inches in width; except, stairways serving a tributary occupant load of less than fifty (50) may be reduced to thirty-six (36) inches in width, and open stairways of incombustible construction serving balconies or tiers of cellblocks of a tributary occupant load of not more than one hundred and fifty (150) may be reduced to thirty-six (36) inches in width.

Buildings of two (2) or more stories in height shall be

provided with not less than two (2) stairways accessible to all areas of the building.

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types I and II construction for each additional stairway over two (2).

One (1) of the required stairways of buildings of four (4) or more stories or tiers in height shall be a smokeproof tower of approved design and construction.

Reference: Chapter 705.

Ramps with a slope not greater than one (1) in eight (8) may be substituted for required stairways, and such ramps shall be not less in width than the required stairway, and one (1) such ramp of not less than sixty (60) inches in width shall be provided areas above the ground floor used as a hospital or infirmary and housing bedridden or incapacitated patients, and such ramp shall discharge upon the exterior of the building at grade level.

407.095—Doors and Doorways

Doorways of buildings of Group F Occupancy used as units of exitways shall be of such capacity and widths as determined by the occupant capacity and tributary occupant loads of the building and areas or portions and specified occupancy uses thereof.

Doors may be used in doorways as single or multiple units as necessary to gain required widths, and no single door shall be less than thirty-six (36) inches or more than fifty-four (54) inches in width; except, doors serving non-hazardous areas to which the public does not have access and of a tributary occupant capacity of less than ten (10) may be thirty (30) inches in width.

Doors of rooms or cell blocks of security areas of more than six (6) units and housing more than six (6) occupants and normally kept locked, and exit doors leading toward and to the exterior of the building from such security areas shall be equipped with a manually operated device to unlock all doors of such areas simultaneously and operated from a central control with an attendant on duty at all times.

Doors to rooms or wards of hospital or infirmary areas used in housing bedridden or incapacitated patients may open inward and shall be not less than fifty-four (54) inches in width and shall be of Class C or of solid wood not less than one and three-quarters ($1\frac{3}{4}$) inches in thickness.

Doors of cells or rooms used for confinement and of security areas may be wholly or part of screen, grill or bars.

Doors of kitchens opening into dining rooms or areas used by occupants shall be of Class C or of solid wood not less than one and three-quarters ($1\frac{3}{4}$) inches in thickness.

Doorways of dining or assembly rooms of security areas

shall open upon an exitway having direct access to a means of egress to the exterior of the building.

Required exits of dining or assembly areas and dormitories or wards shall be arranged a distance apart equal to not less than one-fifth (1/5) of the perimeter of the room.

407.096—Exits to the Exterior

Exits to the exterior of buildings of Group F Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than specified herein.

- 1000 or more occupants Four (4) exits
- 500 to 999 occupants....Three (3) exits
- 10 to 499 occupants.....Two (2) exits

Exit doorways to the exterior shall be not elss than seventy-two (72) inches in clear width exclusive of door framing and doors shall swing to the full width, and exits shall be not less in width than the total required widths of exitways discharging thereto.

The total required widths of exits to the exterior from the building and areas or portions thereof, shall be equally divided among the required number and, except, as provided in this Code, exits shall be not farther apart than twice the specified distance of travel to exit.

407.10—Vertical Openings

Vertical openings in buildings of Group F Occupancy shall be enclosed as provided in this Code and this section.

Reference: Section 401.10.

Stairways leading from the ground floor to stories above or below in buildings of more than two (2) stories in height shall be enclosed; except, stairways within security areas leading to balconies of cellblocks may be unenclosed when of non-combustible construction.

407.11—Light, Ventilation and Sanitation

Buildings of Group F Occupancy and rooms, areas or portions thereof, accessible to the public or used as security areas for housing of occupants, shall have floors and ceilings of not less in area and height than specified herein and shall be provided with sanitation facilities, light and ventilation as specified in this section.

Reference: Section 401.11.

407.111—Ceiling Heights, Room Areas, Light and Ventilation

Minimum ceiling heights and floor areas of rooms and specified areas and required window area based on percentage of floor area and the percentage of window area re-

quired to open for ventilation shall be as provided in the subsection and in Table No. 407-I.

Table No. 407-I
Minimum Ceiling Heights, Room Area and Window Area
Group F

Occupancy Use	Ceiling Height feet	Floor Area sq. ft.	Window		Ventilating System Class
			Area %	Opening %	
Institutional-Asylums-					
Patient rooms	8	80	12	50	II
Day rooms	12		14	50	II
Wards or dormitories	10		14	50	II
Dining rooms	12		14	50	I
Kitchens	12		xx	xx	①III
Penal institutions-					
Cells	8	80	10	50	I
Day rooms	10		12	50	I
Dining rooms	12		14	50	II
Kitchens	12		xx	xx	①III
Non-restrained areas	12		12	50	I

①Required

Artificial lighting and automatic ventilating systems may be substituted for natural light and ventilation, and ventilating systems shall be required as specified in Table No. 407-I and where required or used in lieu of windows shall be of the class specified and as defined in this Code.

Reference: Subsection 401.111.

Table No. 407-J
Required Equipment of Toilet Rooms—Group F

Number of Occupants	No. of Lavatories	No. of Water Closets		No. of Urinals Male
		Female	Male	
Less than 25	1	1	1	1
25 to 49	1	3	1	2
50 to 99	2	5	2	3
100 or over- each 30		1		
each 60	1		1	1

407.112—Sanitation Facilities

Buildings shall be provided with not less than one (1) toilet room on each floor for each sex and each toilet room shall contain not less than one (1) water closet and one (1) lavatory, and each building and area or portion of specified occupancy use thereof, shall have in addition not less than one (1) toilet room for each sex equipped as determined by the occupant capacity of the building or area as provided in Table No. 407-J.

Reference: Subsection 401.113.

407.12—Heating Equipment and Installation

Heating units or apparatus generating heat, chimneys, boiler or furnace rooms and special appliances or equipment for heating buildings of Group F Occupancy shall be installed, located or constructed as provided in this Code and this section.

Reference: Section 401.12.

Heating units or apparatus generating heat shall not be installed, located or constructed within security areas.

407.13—Storage and Special Hazards

Areas or portions of buildings of Group F Occupancy shall not be used for storage, service or special hazard use.

Reference: Section 401.13

Security areas shall not be used for storage.

407.14—Fire Protective Equipment

Fire protective equipment where required or installed in buildings of Group F Occupancy shall be of approved type and shall be installed as provided in this Code and this section.

Reference: Section 401.14.

Alarm system shall be required in all buildings of more than one (1) story in height or of more than ten thousand (10,000) square feet of floor area per story.

Reference: Chapter 715.

Automatic sprinkler systems shall be required in all floored attic spaces and in all usable space below security areas.

Interior wet standpipes shall be required in all buildings of three (3) or more stories in height.

407.15—Special Equipment

Special apparatus, equipment or appliances installed in buildings of Group F Occupancy and becoming an integral part or portion of the structure and affecting the occupants thereof, shall be installed, located or constructed as provided in this Code and this section and subsections.

Reference: Section 401.15.



CHAPTER 408

GROUP G

EDUCATIONAL OCCUPANCY

408.01—Group G Occupancy Defined

Group G Occupancy shall include buildings or structures, and areas or portions thereof, utilized more than four (4) hours per week as an educational classroom or assembly.

Reference: Subsection 401.016.

Reference: Chapter 401—General occupancy requirements.

Division G-1 shall include buildings or structures, and areas or portions thereof, of educational occupancy use for students not above the eighth grade, and shall include:

Grade Schools

Kindergarten

Division G-2 shall include buildings or structures, and areas or portions thereof, of educational occupancy use for students of the seventh grade or above, and shall include:

Grade Schools—7th and

Colleges

8th Grades only

Universities

High Schools

Academies

Areas of assembly and classrooms of more than one hundred (100) occupant capacity or with a stage or enclosed platform shall be subject to provisions of this Code for assembly occupancy.

Reference: Chapter 409.

Dormitories, fraternity or sorority houses, residence halls and areas used in housing students of Division G-2 shall be subject to provisions of this Code for residential occupancy.

Reference: Chapter 403.

408.02—Type of Construction

Buildings of Group G Occupancy may be of Types I, II, III, IV or V construction.

Buildings of more than three thousand (3000) square feet in floor area per story above the first story or of three (3) or more stories in height shall be of not less than one-hour fire-resistive construction throughout.

Class or assembly rooms of an occupant capacity or more than one hundred (100) and rooms used for kindergarten and first or second grades shall not be located above or below the first story in buildings of Types II, III, IV or V construction.

Interior walls or rooms of not more than thirty-two hundred (3200) square feet in floor area may be covered with one (1) inch tongue and groove siding or five-eighths ($\frac{5}{8}$) inch plywood.

408.03—Fire District Requirements

Buildings of Group G Occupancy of Type V construction

shall not be permitted in the Fire District.
Reference: Article III.

408.04—Design and Loading

Buildings of Group G Occupancy and areas or portions thereof of specified occupancy uses shall be designed for unit live loads of pounds per square foot of floor area as provided in this Code and this Section, and as specified in Table No. 408-A.

Reference: Chapter 601.

Table No. 408-A
Unit Live Loads—Group G

Occupancy Use	Pounds per sq. ft.
Assembly-	
Fixed seats	50
Movable seats	100
Balconies-	
Exterior	100
Interior—no seating	40
Bleachers	100
Classrooms	50
Corridors	100
Dining rooms or Cafeterias	100
Foyers and lobbies	100
Gymnasiums	100
Laboratories	75
Libraries-	
Reading rooms	60
Stack rooms	125
Offices	50
Public rooms	100
Rest rooms	50
Stairways and ramps	100
Shops	100
Study halls	100
Storage—light	125

Unit live loads of occupancy uses not specified in this Section shall be determined on the basis of occupancies of similar character.

Floors of areas where partitions are subject to be relocated shall be designed to support in addition to specified loads, a uniformly distributed load equal to twenty (20) pounds per square foot.

408.05—Mixed Occupancy Separation

Buildings of Group G Occupancy and areas or portions thereof, shall be separated from specified areas and other

occupancies of the same building by an occupancy separation of not less in hours of fire-resistive construction than specified in this section and in Table No. 408-B.

Reference: Subsection 401.053.

Table No. 408-B
Mixed Occupancy Separations—Group G

Group Occupancy	A	B	C	D	E	F	G	-H-		I	J	K	L	M
Separation in hours	2	2	2	2	2	3	x	3	2	2	4	2	4	2

Kitchens, bakeries and service areas supplying food to cafeterias or dining rooms shall be separated from adjoining areas by not less than one-hour fire-resistive construction.

Class or study rooms shall be separated from corridors and each other by not less than one-hour fire-resistive construction.

Laboratories, wood, metal working or machine shops, paint rooms, janitor closets, storage rooms and similar areas shall be separated from each other and adjoining areas by not less than one-hour fire-resistive construction.

Assembly areas of more than one hundred (100) occupant capacity or gymnasiums shall be separated from adjoining areas by not less than two-hours fire-resistive construction and shall be constructed as provided in this Code.

Reference: Chapter 409.

408.06—Allowable Floor Area

Buildings of Group G Occupancy shall not exceed the floor areas in square feet per story specified in this section and in Table No. 408-C.

Table No. 408-C
Allowable Floor Area—Group G

Type of Construction	I	II	III	IV	V
Fire Zone I	UL	9000	5000	600	NP
II	UL	10500	6000	4500	NP
Outside Fire District	UL	12750	7200	7200	6000

Allowable floor areas as specified in Table No. 408-C may be increased as provided herein and in Table No. 409-D, and when applicable, increases in percentage of floor area per story as specified for limited heights, one-hour fire-resistive construction, automatic sprinkler system and excess exposure distances may be compounded; except, increases shall not be allowed for one-hour fire-resistive construction or automatic sprinkler systems where required by other provisions of this Code.

Table No. 408-D
Allowable Increases in Floor Area—Group G

Allowable Increases	No. Stor-ies	Percentage of Increase Type of Construction				
		I	II	III	IV	V
Limited Heights- not more than	3	UL	40	40	40	x
	2		75	75	75	75
One-hour Constr.-	x		50	50	50	x
Sprinkler system- more than	1		200	200	200	x
	1		300	300	300	x

Excess Exposure Distance—Reference: Subsection 401.062.

408.07—Limiting Heights

Buildings of Group G Occupancy shall not exceed the limiting heights in stories or the maximum height in feet specified in this section and in Table No. 408-E.

Table No. 408-E
Limiting Heights in Stories—Group G

Types of Construction	I	II	III	IV	V
Fire Zone I	3	2	2	1	NP
II	4	3	2	1	NP
Outside Fire District	5	3	3	2	1
Maximum Ht. in Feet	85	65	65	45	30

Limiting heights as specified in Table No. 408-E may be increased as provided herein; except, increases shall not be allowed for one-hour fire-resistive construction throughout or automatic sprinkler systems where required by other provisions of this Code, or when increases in area have been allowed for such construction or equipment.

Limiting heights may be increased by one (1) story, or fifteen (15) feet, in buildings of Types III, IV or V of one-hour fire-resistive construction throughout, or when equipped with an approved automatic sprinkler system.

408.08—Exterior Walls and Protection of Openings

Exterior bearing walls or portions of such walls and allowable openings therein, of buildings of Group G Occupancy located less than the specified exposure distance from adjacent property lines shall be of not less in fire resistive construction than specified in this section and in Table No. 408-F.

Buildings shall face upon a street or public way of such

size and width to provide an exposure distance of not less than twenty (20) feet in the entire length of one (1) exterior wall, and such exposed exterior wall shall contain the main entrance and exit of the building at grade level.

Table No. 408-F
Fire-Resistance of Exterior Bearing Walls
and Protection of Openings—Group G

Type of Const.	Exposure Distance in feet	Exterior Walls					
		Construction in hours			Protection of Openings in hours		
Fire Zones—		I	II	O	I	II	O
I	Less 3				NP	NP	NP
	Less 30		4	4			
	Less 50	4					
	Minimum	INC	INC	INC	1	1	1
II	Less 3				NP	NP	NP
	Minimum	4	4	4	1	1	1
III	Less 3				NP	NP	NP
	Less 10					1	1
	Less 20				1		
	Minimum	4	4	4			
IV	Less 3	4	4	4	NP	NP	NP
	Less 10		2	2		1	1
	Less 20				1		
	Minimum	2	1				
V	Less 3			4			NP
	Less 10			2			1

NP—Not Permitted. INC—Incombustible.

Buildings shall not be located less than eighty-five (85) feet from gasoline service stations or storage for flammable liquids or buildings of Group L Occupancy.

The minimum exposure distance of buildings of Group G Occupancy from other buildings or structures located on the same property shall be not less than double the height of the highest such building or structure.

408.09—Occupant Capacity and Exitways

The occupant capacity of buildings or structures of Group G Occupancy and areas or portions and specified occupancy uses thereof, and the required number, width and capacity of exitways and units thereof, shall be as provided in this Code and as specified in this section and subsections.

Reference: Section 401.09.

Exitways shall include corridors, lobbies, foyers, arcades, aisles, stairs, ramps, landings, doors, vestibules, exits or other areas serving in whole or in part as a required means of exit travel to the exterior of the building, and exitways shall terminate upon a publicway, public alley or street, or upon a yard, court, or open space with direct access to a publicway, public alley or street.

408.091—Occupant Capacity

The maximum occupant capacity of buildings or structures of Group G Occupancy and areas or portions and specified occupancy uses thereof, and the capacity of exitways or corridors, stairways, doors and exits or units thereof, and the distance of travel to exit, shall not exceed the capacity and distance specified in this Code and in Table No. 408-G.

Table No. 408-G
Maximum Occupant Capacity—Group G

Occupant Use	Occu- pant Capac- ity Sq. Ft. per Occu- pant	Trav- el to Exit (feet)	Number of Occupants per 22" Unit Width			
			Cor- ridor	Exit Stairs	Exit Doors	Exits to ex- terior
Educational:						
Educational buildings	100	100	50	30	40	60
Classrooms	16	100	50	30	40	60
Laboratories	30	100	50	30	40	60
Shops	30	100	50	30	40	60
Cafeterias	15	100	40	30	40	60
Study halls	15	100	50	30	40	60
Gymnasium	15	100	60	60	60	75
Kindergartens & grades 1 and 2	20	60	40	30	40	40
Minimum width in inches			96	60	36	88

408.092—Exitways

Exitways and units thereof, shall be provided buildings of Group G Occupancy and areas or portions and specified occupancy uses thereof, of such capacity, width and number as determined by the occupant capacity of the building, tributary occupant loads, areas and heights and distance of travel to exit as provided in this Code and this section.

Exitways leading into or through kitchens or bakeries serving cafeterias or dining rooms, or through service, storage or hazardous areas, or areas of assembly or classrooms, shall not be included in the required number of exitways.

408.093—Corridors

Corridors of buildings of Group G Occupancy shall be of such capacity and width as determined by the occupant capacity and tributary occupant loads of the building and areas or portions thereof, and shall be not less than ninety-six (96) inches in width.

408.094—Stairways

Stairways of buildings of Group G Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than required for floor area per story for each stairway as specified in Table No. 408-H.

Table No. 408-H

Required Stairways based on Area per Story—Group G

Heights in Stories	Area per Story per Stairway in Sq. Ft. Type of Construction	
	I - II	III - IV - V
Not more than 2	6600	6000
Not more than 3	4400	4000
Not more than 6	4100	3750
Not more than 12	3850	
More than 12	3450	

Stairways shall be not less than sixty (60) inches in width; except, stairways serving areas of the building to which the public does not have access and a tributary occupant load of less than fifty (50) may be thirty-six (36) inches in width.

Buildings of two (2) or more stories in height shall be provided with not less than two (2) stairways accessible to all areas of the building.

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types I and II construction for each additional stairway over two (2).

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types III and IV construction of one-hour fire-resistive construction throughout.

Areas per story as specified for each stairway may be increased by one-third ($\frac{1}{3}$) in buildings of Types I, II, III and IV construction equipped with an approved automatic sprinkler system.

One (1) of the required stairways of buildings of three

(3) or more stories in height shall be a smokeproof tower of approved design and construction.

Reference: Chapter 705.

Ramps with a slope not greater than one (1) in eight (8) may be substituted for required stairways, and such ramps shall be not less in width than the required stairway, and areas above or below the ground floor occupied by children of kindergarten or first and second grades shall be provided with one (1) such ramp leading directly to the exterior of the building at grade level.

Walls at the outer corners of stairway landings shall be curved on a radius of not less than twenty-four (24) inches, or shall be provided with a forty-five (45) degree splay not less than twenty (20) inches in width.

408.095—Doors and Doorways

Doorways of buildings of Group G Occupancy used as units of exitways shall be of such capacity and widths as determined by the occupant capacity and tributary occupant loads of the building and areas or portions and specified occupancy uses thereof.

Doors may be used in doorways as single or multiple units as necessary to gain required widths, and no single door shall be less than thirty-six (36) inches or more than fifty-four (54) inches in width; except, doors serving non-hazardous areas to which the public does not have access and of a tributary occupant capacity of less than ten (10) may be thirty (30) inches in width.

Doors of classrooms shall be not less than fifty-four (54) inches in width and shall open directly to the exterior of the building or upon corridors with direct access to a means of egress from the building and such doors opening upon corridors shall be of Class C or of solid wood not less than one and three-quarters ($1\frac{3}{4}$) inches in thickness.

Classrooms of an occupant capacity of more than fifty (50) shall have not less than two (2) exit doorways arranged a distance apart not less than one-fifth ($1/5$) of the perimeter of the room.

Doors of kitchens or service areas opening into dining areas or cafeterias shall be of Class C or of solid wood not less than one and three-quarters ($1\frac{3}{4}$) inches in thickness.

Doorways of cafeterias or assembly areas shall open directly to the exterior of the building or upon corridors with direct access to a means of egress from the building, and required exits shall be arranged a distance apart equal to not less than one-fifth ($1/5$) of the perimeter of the room.

408.096—Exits to the Exterior

Exits to the exterior of buildings of Group G Occupancy shall be of such capacity, width and number as determined by

the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than specified herein.

- 1000 or more occupants Four (4) exits
- 500 to 999 occupants....Three (3) exits
- 10 to 499 occupants.....Two (2) exits

Exit doorways to the exterior shall be not less than eighty-eight (88) inches in clear width exclusive of door framing and doors shall swing to the full width, and exits shall be not less in width than the total required widths of exitways discharging thereto.

The total required widths of exits to the exterior from the building and areas or portions thereof, shall be equally divided among the required number and, except, as provided in this Code, exits shall be not farther apart than twice the specified distance of travel to exit.

408.10—Vertical Openings

Vertical openings in buildings of Group G Occupancy shall be enclosed as provided in this Code and this section.

Reference: Section 401.10.

Stairways leading from the ground floor to stories above in buildings of more than two (2) stories in height shall be enclosed.

Stairways leading from the ground floor to basements shall be enclosed.

408.11—Light, Ventilation and Sanitation

Buildings of Group G Occupancy and rooms, areas or portions thereof, accessible to the public and used for educational purposes shall have floors and ceilings of not less in area and height than specified herein and shall be provided with sanitation facilities, light and ventilation as specified in this section.

Reference: Section 401.11.

Table No. 408-I
Minimum Ceiling Heights, Room Area and Window Area
Group G

Occupancy Use	Ceiling Height feet	Floor Area sq. ft.	Window		Ventilating System Class
			Area %	Open-ing %	
Educational-					
Classrooms	16		14	50	II
Cafeterias	12		14	50	II
Kitchens	12		xx	xx	①III

①Required

Section 408.111

Ceiling Heights

408.111—Ceiling Heights, Room Areas, Light and Ventilation

Minimum ceiling heights and floor areas of rooms and specified areas and required window area based on percentage of floor area and the percentage of window area required to open for ventilation shall be as provided in this subsection and in Table No. 408-I.

Artificial lighting and automatic ventilating systems may be substituted for natural light and ventilation, and ventilating systems shall be required as specified in Table No. 408-I and where required or used in lieu of windows shall be of the class specified and as defined in this Code.

Reference: Subsection 401.111.

408.112—Sanitation Facilities

Buildings shall be provided with not less than one (1) toilet room on each floor for each sex and each toilet room shall contain not less than one (1) water closet and one (1) lavatory, and each building and area or portion of specified occupancy use thereof, shall have in addition not less than one (1) toilet room for each sex equipped as determined by

Table No. 408-J
Required Equipment of Toilet Rooms—Group G

Number of Occupants	No. of Lavatories	No. of Water Closets		No. of Urinals Male
		Female	Male	
Elementary Schools- 8th grade or below				
Each 20		1		1
Each 35			1	
Each 40	1			
Secondary Schools- 7th grade or above				
Each 25				1
Each 30		1		
Each 50			1	
Each 60	1			
Colleges or University- Each 50				

the occupant capacity of the building or area as provided in Table No. 408-J.

Reference: Subsection 401.113.

408.12—Heating Equipment and Installation

Heating units or apparatus generating heat, chimneys, boiler or furnace rooms and special appliances or equipment for heating buildings of Group G Occupancy shall be installed, located or constructed as provided in this Code and this section.

Reference: Section 401.12.

408.13—Storage and Special Hazards

Areas or portions of buildings of Group G Occupancy shall not be used for storage, service or special hazard use, and such storage as is permitted shall be as provided in this Code.

Reference. Section 401.13.

Supplies or books may be stored in quantities as required for current uses, and storage areas shall be separated from other areas by not less than two-hours fire-resistive construction.

Storage of combustible or explosive materials or products shall not be permitted.

408.14—Fire Protective Equipment

Fire protective equipment where required or installed in buildings of Group G Occupancy shall be of approved type and shall be installed as provided in this Code and this section.

Reference: Section 401.14.

Alarm systems shall be required.

Reference: Chapter 715.

Interior wet standpipes shall be required in all buildings of three (3) or more stories in height.

408.15—Special Equipment

Special apparatus, equipment or appliances installed in buildings of Group G Occupancy and becoming an integral part or portion of the structure and affecting the occupants thereof, shall be installed, located or constructed as provided in this Code and this section and subsections.

Reference: Section 401.15.



CHAPTER 409
GROUP H
ASSEMBLY OCCUPANCY
Indoor

409.01—Group H Occupancy Defined

Group H Occupancy shall include buildings or structures, and areas or portions thereof, of indoor assembly occupancy and shall include:

Auditoriums	Gymnasiums
Theatres	Churches
Public Meeting Rooms	Restaurants
Dance Halls	Skating Rinks
Court Rooms	Council Rooms
Exposition Halls	Union Halls
Coliseums	Lodge Halls

Reference: Section 401.016.

Reference: Chapter 401—General occupancy requirements.

409.01—H Occupancy Defined

Division H-1 shall include buildings and areas or portions thereof of indoor assembly occupancy of an occupant capacity of more than one thousand (1000) and/or used in connection with a stage.

Division H-2 shall include buildings and areas or portions thereof of indoor assembly occupancy of an occupant capacity of three hundred (300) or more and not more than one thousand (1000) and/or containing an enclosed platform. Division H-3 shall include buildings and areas or portions thereof of indoor assembly occupancy of an occupant capacity of less than three hundred (300) and shall not be used with a stage or enclosed platform; except, such assembly occupancy of not more than one hundred (100) occupant capacity as may be included in occupancy Groups B, C or D.

Exposition halls shall be buildings or structures used in exhibiting or displaying livestock, machinery, materials or products and may be of Types I, II or IV construction, and if designed to be utilized as auditoriums for special events and containing or to contain seating for audiences or spectators; except, as provided herein, shall be subject to provisions of this chapter regulating auditorium occupancy based on occupant capacity, and areas above or below the main floor used for exhibition or display purposes shall be designed as provided for the main floor.

Stage, stage areas and enclosed platforms shall be as provided for Group J Occupancy.

Reference: Chapter 411.

409.02—Type of Construction

Buildings of Group H Occupancy shall be of the following Types of Construction:

Division H-1 shall be of Type I Construction.

Division H-2 shall be of Types I, II, III or IV Construction.

Division H-3 shall be of Types I, II, III, IV or V Construction.

Buildings shall be of not less than one-hour fire-resistive construction throughout.

The main floor of assembly rooms or areas of an occupant capacity of more than one hundred (100) shall not be located above or below the ground story in buildings of Types II, III, IV or V construction.

The main floor of buildings of Division H-1 shall not be located above or below the ground floor and no portion of the floor shall be below grade level.

The slope of the main floor of an assembly room or area shall not exceed one (1) in eight (8) and the slope of the floors of mezzanine, balcony or galleries thereof shall not exceed thirty (30) degrees from horizontal.

Gymnasiums or sports arenas may have temporary and removable running tracks, rings or playing courts constructed of wood or unprotected metal.

Interior walls of gymnasiums may be covered with one (1) inch nominal tight tongue and grooved covering, or five-eighths ($\frac{5}{8}$) inch plywood in lieu of fire-resistive plaster.

Fire protection of structural steel framework of roofs of buildings of Type I or II construction more than twenty-five (25) feet above floors, balcony or gallery may be omitted, and where every part of the structural steel framework is more than eighteen (18) feet and less than twenty-five (25) feet above floors, balconies or galleries, the roof construction shall be protected by not less than one-hour fire-resistive construction.

Reference: Article V.

409.03—Fire District Requirements

Buildings of Group H Occupancy of Type V construction shall not be permitted within the Fire District.

Reference: Article III.

409.04—Design and Loading

Buildings of Group H Occupancy and areas or portions thereof of specified occupancy uses shall be designed for unit live loads of pounds per square foot of floor area as provided in this Code and this Section, and as specified in Table No. 409-A.

Reference: Chapter 601.

Table No. 409-A
Unit Live Loads—Group H

Occupancy Use	Pounds per sq. ft.
Armories	150
Auditoriums and assembly-	
Fixed seats	50
Movable seats	100
Balconies and galleries-	
Fixed seats	50
Movable seats	100
Bleachers	100
Chapels	100
Corridors and Aisles	100
Dance hall and floors	100
Dining rooms—public	100
Drill rooms	100
Exposition halls	150
Foyer and lobbies	100
Gymnasiums	100
Loading docks	250
Lodge and meeting halls	100
Marquees	60
Offices	50
Public rooms	100
Raised and Speakers platforms	100
Rest rooms	50
Restaurants	100
Shipping rooms	150
Skating rinks	100
Stairways and ramps	100
Storage-	
Light	125
Heavy	250

Unit live loads of occupancy uses not specified in this Section shall be determined on the basis of occupancies of similar character.

Floors of areas subject to superimposed loads by installation of equipment or machinery, placing, displaying or storage of material or merchandise, or movement of heavy or loaded vehicles shall be designed to support in all affected areas in addition to specified design loads, one and one-half ($1\frac{1}{2}$) times the concentrated superimposed load, which of vehicles shall be the concentrated load of the heaviest loaded single wheel.

409.05—Mixed Occupancy Separation

Buildings of Group H Occupancy and areas or portions

thereof, shall be separated from specified areas and other occupancies of the same building by an occupancy separation of not less in hours of fire-resistive construction than specified in this section and in Table No. 409-B.

Reference: Subsection 401.053.

Table No. 409-B
Mixed Occupancy Separations—Group H

Group Occupancy	A	B	C	D	E	F	G	-H- 1	2	I	J	K	L	M
Separation in hours														
H-1	3	3	3	3	3	3	3	x	3	3	4	3	4	3
H-2	2	2	2	2	2	3	2	3	x	2	4	2	4	2

Kitchens, bakeries and service areas supplying food to restaurants, or dining rooms shall be separated from adjoining areas by not less than one-hour fire-resistive construction.

Dressing and locker rooms, janitor closets, storage rooms and similar areas shall be separated from each other and from adjoining areas by not less than one-hour fire-resistive construction.

Openings to stage areas shall be protected as provided in this Code.

Reference: Section 411.05.

409.06—Allowable Floor Area

Buildings of Group H Occupancy shall not exceed the floor areas in square feet per story specified in this section and in Table No. 409-C.

Table No. 409-C
Allowable Floor Area—Group H

Type of Construction	I	II	III	IV	V
Fire Zone I	UL	6300	4300	600	NP
II	UL	7200	4800	4500	NP
Outside Fire District	UL	9000	5400	5400	3600

Allowable floor areas as specified in Table No. 409-C may be increased as provided herein and in Table No. 409-D, and when applicable, increases in percentage of floor area per story as specified for limited heights, automatic sprinkler system and excess exposure distances may be compounded; except, increases shall not be allowed for automatic sprinkler system where required by other provisions of this Code.

409.07—Limiting Heights

Buildings of Group H Occupancy shall not exceed the limit-

Table No. 409-D
Allowable Increases in Floor Area—Group H

Allowable Increases	No. Stor- ies	Percentage of Increase Type of Construction				
		I	II	III	IV	V
Limited Heights- not more than	3	UL	40	40	40	x
	2		75	75	75	75
Sprinkler system- more than	1		200	200	200	x
	1		300	300	300	x

Excess Exposure Distance—Reference: Subsection 401.062.
ing heights in stories or the maximum height in feet specified in this section and in Table No. 409-E.

Limiting heights as specified in Table No. 409-E may be increased as provided herein; except, increases shall not be allowed for automatic sprinkler systems where required by other provisions of this Code, or when increases in area have been allowed for such equipment.

Table No. 409-E
Limiting Heights in Stories—Group H

Types of Construction	I	II	III	IV	V
Fire Zone I	UL	2	1	1	NP
II	UL	2	1	1	NP
Outside Fire District	UL	2	1	1	1
Maximum Ht. in Feet	UL	45	30	30	30

Limiting heights may be increased by one (1) story, or fifteen (15) feet, in buildings of Types III, IV or V equipped with an approved automatic sprinkler system.

409.08—Exterior Walls and Protection of Openings

Exterior bearing walls or portions of such walls and allowable openings therein, of buildings of Group H Occupancy located less than the specified exposure distance from adjacent property lines shall be of not less in fire-resistive construction than specified in this section and in Table No. 409-F.

Buildings shall face upon a street or public way of such size and width to provide an exposure distance of not less than twenty (20) feet in the entire length of one (1) exterior wall, and such exposed exterior wall shall contain the main entrance and exit of the building at grade level.

Division H-1 shall have not less than three (3) exterior walls exposed in the full length or not less than sixty (60) per

cent of the perimeter of the building to provide for required exits from the building.

Division H-2 shall have not less than two (2) exterior walls exposed in the full length and not less than forty (40) per cent of the perimeter of the building to provide for required exits.

Table No. 409-F
Fire-Resistance of Exterior Bearing Walls
and Protection of Openings—Group H

Type of Const.	Exposure Distance in feet	Exterior Walls					
		Construction in hours			Protection of Openings in hours		
Fire Zones—		I	II	O	I	II	O
I	Less 5				NP	NP	NP
	Less 30		4	4			
	Less 50	4					
	Minimum	INC	INC	INC	1	1	1
II	Less 5				NP	NP	NP
	Minimum	4	4	4	1	1	1
III	Less 5				NP	NP	NP
	Less 10					1	1
	Less 20				1		
	Minimum	4	4	4			
IV	Less 5	4	4	4	NP	NP	NP
	Less 10		2	1		1	1
	Less 20				1		
	Minimum	2	1				
V	Less 5			4			NP
	Less 10			1			1

NP—Not Permitted. INC—Incombustible.

Buildings shall not be located less than eighty-five (85) feet from gasoline service stations or storage for flammable liquids or buildings of Group L Occupancy.

The minimum exposure distance from buildings or structures of Group G Occupancy located on the same property shall be not less than double the height of such buildings or structures.

409.09—Occupant Capacity and Exitways

The occupant capacity of buildings or structures of Group H Occupancy and areas or portions and specified occupancy uses thereof, and the required number, width and capacity of exitways and units thereof, shall be as provided in this

Code and as specified in this section and subsections.

Reference: Section 401.09.

Exitways shall include corridors, lobbies, foyers, arcades, aisles, stairs, ramps, landings, doors, vestibules, exits or other areas serving in whole or in part as a required means of travel to an exit to the exterior of the building, and exitways shall terminate at an exit discharging upon a publicway, public alley or street, or upon an exterior passageway, yard, court or open space with direct access to a publicway, public alley or street.

Auditoriums, theaters or areas of assembly and areas or portions thereof of an occupant capacity of one hundred (100) or more and containing or utilizing fixed or removable seating for spectators or audiences shall have seating and aisles as provided in this section and subsection 409.098.

Seating and aisles of main floor assemblies converted to auditoriums or used for athletic or special events and utilizing removable seating for spectators or audiences shall be as provided in this section for auditoriums.

Division H-1 assembly buildings may be used with a stage, enclosed platform or raised platform, and shall be provided with a foyer as defined in this section and such foyer shall extend the full width of the rear of the assembly area and shall contain the main entrance and exit from and to the exterior of the building.

Division H-2 assembly buildings may be used with an enclosed or raised platform, and shall be provided with a corridor or lobby extending the full width of the rear of the assembly area and containing the main entrance and exit from and to the exterior of the building.

Division H-3 assembly may be used with a raised platform and shall be provided with required exitways discharging to the exterior of the building or upon a lobby, corridor or exitway extending not less than the full width of one (1) wall of the assembly area and with access to not less than two (2) exits to the exterior of the building.

Mezzanine shall be the first level above the foyer or entrance corridor and a mezzanine overlooking the auditorium and containing seating for audiences or spectators shall be considered a balcony.

Balcony shall be the first level overlooking the auditorium and containing seating for audiences or spectators.

Gallery or galleries shall be levels above the balcony overlooking the auditorium and containing seating for audiences or spectators and galleries shall not be permitted in auditoriums of Division H-3.

Boxes shall be semi-private units seating not more than fourteen (14) occupants for each unit and shall be located above the level of the main auditorium floor and may project

over the floor at each side of the auditorium, and groups of boxes totaling an occupant capacity of fifty (50) or more and sharing a single exitway shall be considered balconies or galleries, and boxes located more than twenty-five (25) feet above the main auditorium floor shall be considered galleries.

409.091—Occupant Capacity

The maximum occupant capacity of buildings of Group H occupancy and areas or portions and specified occupancy uses thereof, and the capacity of exitways, or units thereof and the distance of travel to exit shall not exceed the capacity and distance specified in this Code and in Tables No. 409-G, 1 or 2.

Table No. 409-G1
Maximum Occupant Capacity—Group H

Occupant Use	Occu- pant Capac- ity Sq. Ft. per Occu- pant	Trav- el to Exit (feet)	Number of Occupants per 22" Unit Width			
			Cor- ridor & aisles	Exit Stairs	Exit Doors	Exits to ex- terior
Assembly:						
Auditoriums ^①						
Churches ^①						
Exposition halls ^①						
Meeting rooms—	15	100	100	60	80	100
with seating	10	100				
Restaurants—	15	100	100	60	80	100
with dance floor	7	100				
Dance halls	7	100	100	60	80	100
Court rooms	15	100	80	60	80	80
Skating rinks	10	100	100	60	80	100
Lodge-Union halls—	15	100	80	60	80	80
with seating	10	100	80	60	80	80
Gymnasium	15	100	60	60	60	75
Assembly areas—						
with seating	6					
no seating	15					
Minimum width in inches			44	44	44	60

^①See Table No. 409-G2

The maximum occupant capacity of auditoriums, theaters exposition halls and areas of assembly occupancy of a capacity of more than one hundred (100) and containing or utilizing fixed or removable seating for audiences or spectators, and the capacity of exitways or units thereof, and the distance of travel to exit shall not exceed the capacity and distance specified in Table No. 409-G2.

Table No. 409-G2

Maximum Occupant Capacity—Auditoriums—Group H

	Main Floor	Bal- cony	Gal- lery	Boxes	Foyer
Occupant Capacity— sq. feet per seat	6	6	6	10	1
Exposition halls— display area	15				
seating area	6				
Travel to Exit— in ft. to exterior	100	75	75	60	100
to foyer		75	75		
Exposition halls	150				
Number of Exits— to exterior—H-1	2	2	2	1	1
H-2	1	1	2		1
each 100 occupants	1				
each 750 occupants		1	1		
to foyer—H-1	2	1	1		
H-2	2	1	1	1	
H-3	2	1	NP	1	
Minimum Widths— in inches					
Exits to Exterior	60	60	60		120
Stairs		44	44	36	
Exits to foyer	54	44	44		
Aisles	36	36	36		
Cross aisles	48	48	48		
Corridors				42	
Exit corridor					180
Occupant Capacity— per 22" unit of width					
Exits to exterior	150	75	75		
To 1000 occupants					95
1000 to 2000					190
over 2000					380
Exits to foyer		150	75		
Stairs—					
to exterior		75	75		
to foyer		150	75		
Distance between Exits—in feet					
to exterior	100	125	125		
to foyer	21				

Foyers as referred to in Table No. 409-G2 shall include foyers, lobbies, corridors or entranceways, as required in this section, serving as the main entranceway and exitway from or to the exterior of the building, and exit corridors shall be an area, corridor or interior passageway leading from the foyer to the main exit to the exterior of the building.

Occupant capacity shall be determined based upon specified square feet of area per occupant or seat.

The distance of travel to exit shall be the maximum distance of horizontal travel in feet to an exit to the exterior of the building or to a fire corridor where permitted or a smokeproof tower or both opening directly to the exterior of the building at grade level, or in auditoriums or theaters shall be the distance to an exit discharging upon the foyer or entrance corridor.

The aggregate total widths of exitways or units thereof shall be determined based upon the specified number of occupants or seats and tributary occupant load for each twenty-two (22) inch unit of width, and no single unit shall be less in width than the specified minimum in inches.

The tributary occupant load of any balcony, gallery, story or level and an exitway thereto shall be fifty (50) percent of the occupant load of the level next above or below discharging upon a common exitway.

The number of exitways or units thereof, shall be determined based upon square feet of area served, the distance of travel to exit and the maximum distance between exitways as specified herein, and the total required widths shall be equally distributed among the required number.

Required exits to the exterior of main floors, balconies and galleries of auditoriums shall be determined by the occupant capacity of the area and exitways to the foyer shall not decrease from the required number widths or capacity or shall exitways to the exterior affect the required number, widths and capacity of required exitways to foyer.

409.092—Exitways

Exitways and units thereof shall be provided buildings of Group H Occupancy and areas or portions and specified occupancy uses thereof, of such capacity, width and number as determined by the occupant capacity of the building, tributary occupant loads, areas and heights and distance of travel to exit as provided in this Code and this section.

Reference: Subsection 401.092.

Exitways leading into or through kitchens, bakeries or service areas supplying food to the assembly area, or through stages, enclosed platforms, dressing or locker rooms, service, storage or hazardous areas shall not be included in the required number of exitways.

Exitways and floors and aisles thereof and exits to the

exterior shall be marked and illuminated as provided in this Code, and the illumination of floors of exitways or aisles of auditoriums or theaters where pictures, motion pictures or other projections are made by means of direct light may be reduced during the period of projection to not less than twenty (20) per cent of the specified intensity.

Exposition Halls containing no stage, enclosed platform or fixed seating on the main floor shall have exitways to the exterior of the building of not less than sixty (60) inches in width on all four walls of the building from the main floor and not less than one hundred (100) feet apart and the distance of travel to exit shall be not more than one hundred and fifty (150) feet.

Fire corridors of approved construction and fire resistance may be permitted as exitways from main floors of exposition halls and such corridors shall contain but one (1) entrance opening and shall be not more in length than one hundred and fifty (150) feet and shall discharge upon the exterior of the building.

Fire corridors may be located on the main floor or the first level below and where located below the main floor shall be provided with ramps for entrance of a slope not greater than one (1) in eight (8) and the length of the entrance ramp shall be included in the allowable length of the corridor, or deducted from the allowable distance of travel to exitway.

Fire corridors discharging to the exterior of the building below grade shall be provided with ramps to grade level of a slope not greater than one (1) in eight (8) and such ramps shall be enclosed in their full length by the same construction as the fire corridor.

Main Assembly Floors.

Exits of main assembly floors discharging directly to the exterior of the building shall discharge at grade level and shall be not less than sixty (60) inches in width and not less in width than the width of the cross aisle discharging thereto.

The distance of travel to exits shall not exceed one hundred (100) feet.

Main assembly floors shall be provided not less than one (1) exit discharging directly to the exterior for each one thousand (1000) seats.

The total required widths of exits discharging directly to the exterior shall be determined by an occupant capacity of one hundred and fifty (150) seats for each twenty-two (22) inch unit of exit width, and the total required width shall be equally divided among the required number.

Boxes

Boxes shall discharge upon a corridor at the floor level of

the box of not less than forty-two (42) inch clear width containing an enclosed stairway of not less than thirty-six (36) inches in width and discharging directly to the exterior of the building at grade level or upon the main assembly floor at an exit to the exterior or into the foyer or lobby, and the distance of travel to such stairway shall not exceed sixty (60) feet.

Balconies and Galleries

Balconies or galleries of an occupant capacity of fifty (50) or more shall have not less than two (2) exitways as provided for Divisions I, II or III.

Exitways shall be not less than forty-four (44) inches in width and total required widths shall be determined based on occupant capacity of the area and the tributary occupant load served.

Total required widths of exitways to the exterior shall be determined by an occupant load of seventy-five (75) for each twenty-two (22) inch unit of width, and there shall be not less than one (1) exitway to the exterior for each seven hundred and fifty (750) occupants.

Total required widths of exitways to the foyer shall be determined by an occupant load of one hundred and fifty (150) for each twenty-two (22) inch unit of width, and there shall be not less than one (1) exitway to the foyer for each seven hundred and fifty (750) occupants.

Exitways to the foyer from galleries shall be enclosed from the gallery to the foyer.

Distance of travel to exit shall not exceed seventy-five (75) feet.

Exitways to the exterior shall not be farther apart than one hundred and twenty-five (125) feet.

Exitways may be of stairs or ramps or both and when leading above the first balcony shall be as provided for Divisions I, II and III.

Balconies or galleries overlooking the main assembly floor and extending more than forty (40) per cent of the perimeter of the main assembly floor shall be provided with exitways to the exterior as specified for Divisions I, II or III not farther apart than one hundred and twenty-five (125) feet.

Division H-1 shall have not less than four (4) exitways from the main assembly floor and one (1) shall lead directly to the exterior of the building at grade level on each of two (2) opposite sides of the assembly floor and two (2) shall discharge upon the required foyer.

Exits to the exterior shall be not farther apart than one hundred (100) feet measured along the perimeter of the walls.

Balconies or galleries shall have not less than two (2) exit-

ways leading to the exterior of the building at grade level and one (1) shall be located at each side of the area and such exitways of galleries shall be smokeproof towers.

Division H-2 shall have not less than three (3) exitways from the main assembly floor and one (1) shall discharge directly to the exterior of the building at grade level from one (1) side of the assembly floor and two (2) shall discharge upon the required entrance lobby or corridor.

Exitways shall be not farther apart than one hundred (100) feet and the distance of travel to exit shall not exceed one hundred (100) feet.

Balconies or galleries of an occupant capacity of fifty (50) or more shall have not less than two (2) exitways, one (1) located at each side of the area, and one (1) shall be a smokeproof tower and shall discharge directly to the exterior of the building at grade level and one (1) may discharge upon the entrance lobby or corridor; except, exitways leading from galleries above the balcony shall be enclosed.

Division H-3 shall have not less than two (2) exitways from the main assembly floor which shall discharge directly to the exterior of the building or upon a corridor or exitway with direct access to two (2) exits to the exterior.

Exitways shall be not less than twenty (20) per cent of the perimeter of the area apart.

Balconies of an occupant capacity of fifty (50) or more shall have not less than two (2) exitways, one (1) located at each side of the area and discharging to the main floor of the assembly or upon a corridor or exitway with direct access to an exit to the exterior.

409.093—Corridors

Corridors of buildings of Group H Occupancy shall be of such capacity and width as determined by the occupant capacity and tributary occupant loads of the building and areas or portions thereof.

Corridors of areas to which the public does not have access and of a tributary occupant load of less than ten (10) may be not less than thirty-six (36) inches in width.

Corridors serving boxes as provided herein shall extend the full length of the box area and shall contain not less than one (1) enclosed stairway leading to the main floor and the width exclusive of stairway enclosure and steps leading from boxes shall be not less than forty-two (42) inches in width.

Corridors of boxes may also discharge through areas of mezzanine, balconies or galleries.

409.094—Stairways

Stairways of buildings of Group H Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of

travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than required for floor area per story for each stairway as specified in Table No. 409-H.

Table No. 409-H
Required Stairways based on Area per Story—Group H

Heights in Stories	Area per Story per Stairway in Sq. Ft. Type of Construction	
	I - II	III - IV - V
Not more than 2	6600	6000
Not more than 3	4400	4000
Not more than 6	4000	
Not more than 12	3600	
More than 12	3200	

Areas per story as specified may be increased by ten (10) per cent in buildings of Types I and II construction for each additional stairway over two (2).

Areas per story as specified may be increased by one-third ($\frac{1}{3}$) in buildings of Types I, II, III or IV construction equipped with an approved automatic sprinkler system.

Stairways serving balconies or galleries shall be not less than forty-four (44) inches in width and each balcony or gallery of an occupant capacity of fifty (50) or more shall be served by not less than two (2) stairways.

Boxes shall have access to not less than one (1) enclosed stairway of not less than thirty-six (36) inches in width and discharging directly to the exterior of the building or upon the main assembly floor at an exitway to the exterior or upon the foyer or entrance corridor.

Walls at the outer corners of stairway landings shall be curved on a radius of not less than two (2) feet, or shall be provided with a forty-five (45) degree splay not less than twenty (20) inches in width.

409.095—Doors and Doorways

Doorways of buildings of Group H Occupancy used as units of exitways shall be of such capacity and widths as determined by the occupant capacity and tributary occupant loads of the building and areas or portions and specified occupancy uses thereof.

Doors may be used in doorways as single or multiple units as necessary to gain required widths, and no single door shall be less than thirty-six (36) inches or more than fifty-four (54) inches in width, except, doors serving non-hazardous areas to which the public does not have access and of a

tributary occupant capacity of less than ten (10) may be thirty (30) inches in width.

Doors of kitchens or service areas opening into public dining or assembly areas shall be of Class C or of solid wood not less than one and three-quarters (1 3/4) inches in thickness.

Doorways of public meeting or dining rooms located on other than the ground floor, shall open directly to an exit stairs, corridor, foyer, or exitway with direct access to a means of egress to the exterior of the building.

All doors shall swing in the direction of exit travel and doors of exits to the exterior shall be equipped with approved panic hardware; except, doors serving as entranceways may swing in both directions and not less than one hundred and eighty (180) degrees.

Exit doorways to the exterior shall be not less than the required widths in clear width exclusive of door framing and doors shall swing to the full width, and exits shall be not less in width than the total required widths of exitways discharging thereto.

409.096—Exits to the Exterior

Exits to the exterior of buildings of Group H Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than specified herein.

Less than 300 occupants	two (2) exits
300 to 999 occupants	three (3) exits
1,000 or more occupants	four (4) exits
Each 1,000 occupants	one (1) exit

The total required widths of exits to the exterior from the building and areas or portions thereof, shall be equally divided among the required number and, except, as provided in this Code, exits shall be not farther apart than twice the specified distance of travel to exit.

Exits to the exterior direct from the main assembly floor or balconies or galleries shall be not less than sixty (60) inches in width and not less in width than the cross aisle of exitway discharging thereto.

Main exits to the street from the foyer, lobby or corridor shall be not less in width than one hundred and twenty (120) inches and required widths shall be determined by the total occupant capacity of the auditorium based on occupant load for each twenty-two (22) inch unit of width and for the first one thousand (1000) occupants shall be ninety-five (95) occupants for each unit; for the second one thousand (1,000) occupants the capacity shall be one hundred and ninety (190) occupants for each unit and over two thousand (2,000) oc-

cupants shall be three hundred and eighty (380) occupants for each unit.

Secondary exits to the exterior may be located in the foyer, lobby or corridor and shall be not less than seventy-two (72) inches in width and may be located at each end of the area and shall reduce the occupant load of the main exit by fifty (50) occupants for each twenty-two (22) inch unit of width.

Exits to the exterior shall discharge at grade level upon a publicway, public alley or street or upon a yard, court, open space or passageway with direct access to a publicway, public alley or street of not less in widths than provided herein.

Publicways, public alleys or streets shall be not less than twenty (20) feet in width.

Yards, courts or open spaces shall be not less than fifteen (15) feet in width.

Passageways shall be not less than sixty (60) inches in width, or less than the width of any exit discharging thereto, and widths shall be increased by twelve (12) inches for each five hundred (500) occupants of the building over one thousand (1,000), and passageways shall be enclosed with the same construction as the building and shall be not less in clear height than eighty-four (84) inches.

Doors opening upon or swinging into yards, courts, open spaces or passageways used as required exitways shall not reduce the required widths.

Change in levels of yards, courts, open spaces or passageways shall be compensated by a ramp extending the full required width of a slope of not more than one (1) in eight (8).

409.097—Foyers and Floor Levels

Buildings of Group H Occupancy and areas or portions and specified occupancy uses thereof shall be provided with a foyer, lobby, entrance or exitway corridor located to the rear of the assembly area and containing the main entrance and exit, and assembly areas shall have floor levels as provided herein.

409.0971—Foyers

Division H-1 shall be provided with a foyer of not less in width in any portion than the total widths of exitways, stairways and aisles discharging thereto and not less in area in square feet than the total occupant or seating capacity of the assembly and balcony and galleries thereof.

Division H-2 assembly shall discharge upon a lobby or corridor not less in width than the total widths of exitways, stairways and aisles discharging thereto and such width shall not be less than ninety-six (96) inches.

Foyers, lobbies or corridors may be provided with an entrance or exitway leading to the main exit to the exterior of

the building and ramped with a slope not greater than one (1) in ten (10) and the width of such entrance or exitway shall be not less than twenty-five (25) per cent over the required width of the foyer or corridor.

Foyers, lobbies or corridors in full width shall extend the full width of the auditorium or assembly and floors shall be level and of the same level as the rear of the assembly floor discharging thereto.

Stairs discharging upon or doors swinging into foyers or corridors shall not reduce the required widths or areas.

The distance of travel in foyers, lobbies or corridors to an exit to the exterior shall not exceed one hundred (100) feet.

Main entranceway and exits may be provided with vestibule doors and the distance between vestibule doors shall be not less than three (3) times the swing of such doors and floors of vestibules shall be level.

Ticket booths located in the entranceway shall not exceed in width ten (10) per cent of the width of the entranceway.

409.0972—Floor Levels

Floor levels of auditoriums or assemblies and areas or portions thereof may be sloped from the rear to the front of the area as provided herein and such slope shall be equal throughout the area except, floors of cross aisles and widths of aisles, cross aisles, foyers, lobbies, corridors and exitways shall be level.

Main floors may have a slope not to exceed one (1) in eight (8).

Floors of balconies and galleries may have a change of level not to exceed thirty (30) degrees from horizontal, and changes of more than one (1) in five (5) shall be compensated by terracing for each row of seats and no single change in level thereof shall exceed fourteen (14) inches.

Steps of a width of not less than the width of the aisle and with risers of not more than seven and one-half (7½) inches and treads of not less than ten (10) inches shall be employed on terraced floors; except, not more than two (2) such steps shall be used at any change of level.

Floors between rows of seats shall be the same level as the level of the portion of the aisle onto which the seats discharge.

Slopes of aisles shall not exceed one (1) in five (5) and floors of aisles or areas of a slope exceeding one (1) in eight (8) shall be provided with a non-slip surfacing.

Boxes shall have level floors, except the floor level of each such box may be raised above the adjoining box ahead not to exceed fourteen (14) inches, and corridors thereof shall be ramped to compensate for the change of level with a slope not to exceed one (1) in eight (8) or such corridors may be pro-

vided with steps of a rise of not more than seven and one-half ($7\frac{1}{2}$) inches and a tread of not less than ten (10) inches and such steps shall extend the full width of the corridor and no single change of floor level shall exceed fourteen (14) inches.

409.098—Aisles and Seating.

Buildings of Group H Occupancy and areas or portions thereof used as areas of assembly, auditoriums, theaters, exposition halls or of an assembly occupancy capacity of one hundred (100) or more of spectators or audiences, shall be provided with seating and aisles thereto as specified herein.

409.0981—Seating

The seating capacity of areas of assembly and auditoriums, theaters or exposition halls used to seat audiences or spectators shall not exceed one (1) seat for each six (6) square feet of floor area exclusive of floor areas of corridors, foyers, stages, or enclosed platforms.

Seats shall be not less than eighteen (18) inches in width, and rows of seats shall be not less than thirty-three (33) inches from back to back; except, seats or benches without backs may be thirty (30) inches from back to back.

There shall be not more than fourteen (14) seats in any row or portion thereof between aisles, and each such row or portion thereof shall be served by two (2) aisles.

Seats of main floors of assembly areas may be removable or fixed.

Seats of balconies or galleries of an occupant capacity of fifty (50) or more shall be fixed.

Seats of boxes of an occupant capacity of fifteen (15) or more shall be fixed.

Seats located on floors sloped more than one (1) in eight (8) or on terraced areas shall be fixed.

Fixed seats shall be securely anchored to the floor.

The use of removable or portable bleachers shall be subject to approval of the Building Official.

409.0982—Aisles

Aisles of areas seating audiences or spectators shall extend the full length from the front of such areas to the rear and shall be not less than thirty-six (36) inches in width and not farther apart than twenty-two (22) feet and there shall be not more than fourteen (14) seats between aisles.

Division H-1 aisles shall discharge directly upon the foyer and shall increase in width by three (3) inches for each ten (10) feet of distance or travel to the foyer.

Division H-2 aisles shall increase in width by three (3) inches for each ten (10) feet of distance of travel to a cross aisle or exitway to the exterior and aisles shall not decrease in width

at any point between the front and rear of the assembly area.

Aisles of balconies or galleries shall discharge upon a cross aisle leading directly to an exitway or into an exitway and shall increase in width in the direction of exit travel and aisles shall not decrease in width at any point between the front and rear of the balcony or gallery.

Steps, stairs or obstructions shall not be permitted on aisles; except, as provided for terraced balconies or galleries.

Exposition halls containing displays or booths of displays shall have aisles facing such displays of not less than ninety-six (96) inches in width and where running between booths or displays shall be increased by fifty (50) per cent in width and such aisles shall extend the full length of the hall and discharge into an exitway or cross aisle leading to such exitway.

Exposition halls shall have cross aisles not less than one hundred (100) feet apart and of a width not less than the width of any aisle they intercept, and cross aisles shall intercept each aisle and extend the full width of the hall and discharge directly into an exitway from the hall.

409.0983—Cross Aisles

Auditoriums and assemblies and areas and portions thereof, shall be provided with cross aisles as provided herein.

Main floors of auditoriums or assemblies containing forty (40) or more rows of seats shall be provided with cross aisles, in such number as required by occupant capacity and travel to exit distance.

Balconies or galleries containing twenty (20) or more rows of seats shall be provided with cross aisles in such number as required by occupant capacity and travel to exit distance.

Cross aisles shall be of not less than forty-eight (48) inches in clear unobstructed level widths and shall extend uninterrupted the entire width of the area served intercepting each aisle and discharging at each side of the area into an exitway or exit to the exterior.

Cross aisles shall increase in width in the direction of exit travel by three (3) inches for each ten (10) feet of distance thereof.

Cross aisles shall not vary in floor level more than twelve (12) inches, and such variation shall be compensated by a ramp the entire width of the cross aisle of a slope of not more than one (1) in eight (8).

Each required exit to the exterior located to the side of the assembly floor or balcony area shall have a cross aisle extending the full width of the assembly discharging directly thereto, and each required cross aisle shall discharge directly to an exit to the exterior.

The number of required cross aisles shall be distributed

and located equally throughout the area served.

Cross aisles of balconies and galleries paralleling a vertical drop or change of floor level of more than eight (8) inches except of aisles, shall be provided with a railing.

409.10—Vertical Openings

Vertical openings of buildings of Group H Occupancy shall be enclosed as provided in this Code and this section.

Reference: Section 401.10.

Stairways shall be enclosed; except, monumental stairways and stairways or ramps leading from the foyer to the mezzanine or the first balcony may be unenclosed.

409.11—Light, Ventilation and Sanitation

Buildings of Group H Occupancy and areas or portions thereof, accessible to the public and used for assembly purposes shall have floors and ceilings of not less in area and height than specified herein and shall be provided with sanitation facilities, light and ventilation as specified in this section.

Reference: Section 401.11.

Table No. 409-I

Minimum Ceiling Heights, Room Area and Window Area
Group H

Occupancy Use	Ceiling Height feet	Floor Area sq. ft.	Window		Ventilating System Class
			Area %	Opening %	
Auditoriums—Main floor	24		14	50	II
Balconies	16		14	50	II
Foyers	16		14	50	II
Meeting rooms	16		14	50	II
Restaurants	12		14	50	II
Kitchens	12		xx	xx	ⓐIII
Halls	16		14	50	II
Court rooms	16		14	50	II
Gymnasiums	24		14	50	II
Dressing rooms	8	100	12	50	I
Locker rooms	8	100	12	50	I

ⓐRequired

409.111—Ceiling Heights, Room Areas, Light and Ventilation
Minimum ceiling heights and floor areas of rooms and specified areas and required window area based on percent-

age of floor area and the percentage of window area required to open for ventilation shall be as provided in this subsection and in Table No. 409-I.

Artificial lighting and automatic ventilating systems may be substituted for natural light and ventilation, and ventilating systems shall be required as specified in Table No. 409-I and where required or used in lieu of windows shall be of the class specified and as defined in this Code.

Reference: Subsection 401.111.

409.112—Sanitation Facilities

Buildings shall be provided with not less than one (1) toilet room on each floor for each sex and each toilet room shall contain not less than one (1) water closet and one (1) lavatory, and each building and area or portion of specified occupancy use thereof, shall have in addition not less than one (1) toilet room for each sex equipped as determined by the occupant capacity of the building or area as provided in Table No. 409-J.

Reference: Subsection 401.113.

Table No. 409-J

Required Equipment of Toilet Rooms—Group H

Number of Occupants	No. of Lavatories	No. of Water Closets		No. of Urinals Male
		Female	Male	
Each 125		1		
Each 150				1
Each 200			1	
Each 250	1			

409.12—Heating Equipment and Installation

Heating units or apparatus generating heat, chimneys, boiler or furnace rooms and special appliances or equipment for heating buildings of Group H Occupancy shall be installed, located or constructed as provided in this Code and this section.

Reference: Section 401.12.

409.13—Storage and Special Hazards

Areas or portions of buildings of Group H Occupancy shall not be used for storage, service or special hazard use, and such storage as is permitted shall be as provided in this Code.

Reference: Section 401.13.

Storage of combustible or explosive materials or products shall not be permitted.

Equipment or removable seating may be stored in areas

separated from other areas by not less than two-hour fire resistive construction.

Film or reels of motion pictures shall not be stored except, as required for current uses or showing.

409.14—Fire Protective Equipment

Fire protective equipment where required or installed in buildings of Group H Occupancy shall be of approved type and shall be installed as provided in this Code and this section.

Reference: Section 401.14.

Alarm systems shall be required in all areas of assembly occupancy above or below the ground floor, and shall be required in all areas of assembly occupancy of a main floor capacity of five hundred (500) or more or when used in connection with a stage with movable scenery.

Automatic sprinkler systems shall be required in all areas of basements used as work or maintenance rooms, and, except in buildings of type I construction, in all enclosed occupied space and over all stairways or exitways.

Interior wet standpipes shall be required in all assembly buildings of more than three hundred (300) occupant capacity or using a stage, and shall extend from the basement to the uppermost story or level with outlets located on each side of the rear of the auditorium and on each side at the rear of balconies and galleries.

409.15—Special Equipment

Special apparatus, equipment or appliances installed in buildings of Group H Occupancy and becoming an integral part or portion of the structure and affecting the occupants thereof, shall be installed, located or constructed as provided in this Code and this section and subsections.

Reference: Section 401.15.

CHAPTER 410

GROUP I

ASSEMBLY OCCUPANCY

Outside

410.01—Group I Occupancy Defined

Group I Occupancy shall include buildings or structures and areas or portions thereof, of outdoor assembly occupancy, and shall include:

Stadiums

Amusement Park

Structures

Drive-in Theatres

Fair Ground Structures

Grand Stands

Baseball Parks

Race Tracks

Athletic Field Structures

Reference: Subsection 401.016.

Reference: Chapter 401—General occupancy requirements.

410.02—Type of Construction

Buildings or structures of Group I Occupancy may be of Types I, II, III, IV or V construction.

Reference: Article V.

Balconies, bleachers or grandstands over usable space shall be protected on the underside by not less than one-hour fire-resistive construction.

Grandstands, bleachers and areas of race tracks occupied by spectators shall be protected by a retaining barrier and screen located not less than six (6) feet in front of the area and facing the race track, and the barrier shall be of sufficient strength and height to withstand the impact load of a colliding vehicle, and the screen shall be of sufficient strength and height to protect spectators from flying debris or parts of the vehicle.

Structures of amusement park rides, conveyances or devices shall be constructed of heavy timber or incombustible framing.

Amusement park, fairground or exposition buildings used by the public shall be classified under the group occupancy the use most nearly resembles and shall be of not less than one-hour fire-resistive construction.

410.03—Fire District Requirements

Buildings or structures of Group I Occupancy of Types II, III, IV or V construction shall not be permitted in Fire Zone I, and of Type V construction shall not be permitted in Fire Zone II.

Reference: Article III.

410.04—Design and Loading

Buildings or structures of Group I Occupancy and areas

or portions thereof of specified occupancy uses shall be designed for unit live loads of pounds per square foot for floor area as provided in this Code and this Section, and as specified in Table No. 410-A.

Reference: Chapter 601.

Table No. 410-A
Unit Live Loads—Group I

Occupancy Use	Pounds per sq. ft.
Amusement park devices and structures	150
Balconies	100
Bandstands	100
Bleachers	100
Corridors and Aisles	100
Dance floors	100
Dining rooms—public	100
Foyers, lobbies and exitways	100
Grandstands	100
Marquees	60
Offices	50
Pavilions	125
Public rooms	100
Rest rooms	50
Reviewing stands	100
Speakers or raised platforms	100
Sidewalks	250
Stadiums	100
Stairways and ramps	100
Storage-	
Light	125
Heavy	250

Unit live loads of occupancy uses not specified in this Section shall be determined on the basis of occupancies of similar character.

Floors or areas subject to superimposed loads by installation of equipment or machinery, placing, displaying or storage of material or merchandise, or movement of heavy or loaded vehicles, shall be designed to support in all affected areas in addition to specified design loads, one and one-half ($1\frac{1}{2}$) times the concentrated superimposed load, which of vehicles shall be the concentrated load of the heaviest loaded single wheel.

410.05—Mixed Occupancy Separation

Buildings or structures of Group I Occupancy and areas or portions thereof, shall be separated from specified areas and other occupancies of the same building or structure by

an occupancy separation of not less in hours of fire-resistive construction than specified in this section and in Table No. 410-B.

Reference: Subsection 401.053.

Table No. 410-B
Mixed Occupancy Separations—Group I

Group Occupancy	A	B	C	D	E	F	G	-H-		I	J	K	L	M
Separation in hours	1	1	1	1	2	3	2	3	2	x	4	2	4	1

Kitchens, bakeries or service areas supplying food and restaurants, dining rooms or concessions shall be separated from adjoining areas by not less than one-hour fire-resistive construction.

Locker rooms, dressing rooms, offices, ticket booths, storage areas for non-hazardous materials and equipment and other non-hazardous uses shall be separated from each other and from adjoining areas by not less than one-hour fire-resistive construction.

Stages or enclosed platforms shall be constructed as provided in this Code; except, enclosed platforms may be used with outdoor assembly structures when separated by an exposure distance on one hundred (100) per cent of the perimeter of the stage building of not less than twenty (20) feet, and subject to approval of the Building Official a temporary or removable platform may be used.

Reference: Chapter 411.

10.06—Allowable Floor Area

Buildings or structures of Group I Occupancy shall not exceed the floor areas in square feet per story specified in this section and in Table No. 410-C.

Table No. 410-C
Allowable Floor Area—Group I

Type of Construction	I	II	III	IV	V
Fire Zone I	UL	NP	NP	NP	NP
II	UL	11000	4500	4500	NP
Outside Fire District	UL	UL	7200	18000	1800

Allowable floor areas as specified in Table No. 410-C may be increased as provided herein and in Table No. 410-D, and when applicable, increases in percentage of floor area per story as specified for limited heights, one-hour fire-resistive construction, automatic sprinkler system and excess exposure distances may be compounded; except, increases shall not be allowed for one-hour fire-resistive construction or automatic sprinkler system where required by other pro-

visions of this Code.

Allowable areas of grandstands, stadiums, bleachers or similar structures of Types II or IV construction shall not be limited; provided, all areas or portions of the structure are sixty (60) feet or more from adjacent property lines and the structure is of open construction with no exterior walls on more than fifty (50) per cent of its perimeter.

Table No. 410-D
Allowable Increases in Floor Area—Group I

Allowable Increases	No. Stories	Percentage of Increase Type of Construction				
		I	II	III	IV	V
Limited Heights— not more than	3	UL	40	40	40	x
	2		75	75	75	75
One-hour Constr.-	x		50	50	50	x
Sprinkler system— more than	1		200	200	200	x
	1		300	300	300	x

Excess Exposure Distance—Reference: Subsection 401.062

410.07—Limiting Heights

Buildings of Group I Occupancy shall not exceed the limiting heights in stories or the maximum height in feet specified in this section and in Table No. 410-E.

Table No. 410-E
Limiting Heights in Stories—Group I

Types of Construction	I	II	III	IV	V
Fire Zone I	UL	NP	NP	NP	NP
II	UL	2	2	2	NP
Outside Fire District	UL	3	2	3	1
Maximum Ht. in Feet	UL	55	45	55	30

Limiting heights as specified in Table No. 410-E may be increased as provided herein; except, increases shall not be allowed for one-hour fire-resistive construction throughout or automatic sprinkler systems where required by other provisions of this Code, or when increases in area have been allowed for such construction or equipment.

Limiting heights may be increased by one (1) story, or fifteen (15) feet, in buildings of Types II or IV of one-hour fire-resistive construction throughout, or when equipped with an approved automatic sprinkler system.

410.08—Exterior Walls and Protection of Openings

Exterior bearing walls or portions of such walls and al-

lowable openings therein, of buildings of Group I Occupancy located less than the specified exposure distance from adjacent property lines shall be of not less in fire-resistive construction than specified in this section and in Table No. 410-F.

Table No. 410-F
Fire-Resistance of Exterior Bearing Walls
and Protection of Openings—Group I

Type of Const.	Exposure Distance in feet	Exterior Walls					
		Construction in hours			Protection of Openings in hours		
Fire Zones—		I	II	O	I	II	O
I	Less 5				NP	NP	NP
	Less 30		4	4			
	Less 50	4					
	Minimum	INC	INC	INC	1	1	1
II	Less 5					NP	NP
	Minimum		4	4		1	1
III	Less 5					NP	NP
	Less 10					1	1
	Minimum		4	4			
IV	Less 5		4	4		NP	NP
	Less 10		2	2		1	1
	Minimum		1				
V	Less 5			4			NP
	Less 10			2			1

NP—Not Permitted. INC—Incombustible.

Buildings shall face upon a street or public way of such size and width to provide an exposure distance of not less than twenty (20) feet in the entire length of one (1) exterior wall, and such exposed exterior wall shall contain the main entrance and exit of the building at grade level.

Buildings shall not be closer than eighty-five (85) feet to gasoline service stations, storage of inflammable liquids or buildings of Group L Occupancy.

410.09—Occupant Capacity and Exitways

The occupant capacity of buildings or structures of Group I Occupancy and areas or portions and specified occupancy uses thereof, and the required number, width and capacity of exitways and units thereof, shall be as provided in this Code and as specified in this section and subsections.

Reference: Section 401.09.

Exitways shall include corridors, lobbies, foyers, arcades, aisles, stairs, ramps, landings, doors, vestibules, exits or other areas serving in whole or in part as a required means of travel to an exit to the exterior of the structure, and exitways shall terminate upon a publicway, public alley or street, or upon a yard, court, open space or passageway with direct access to a publicway, public alley or street.

410.091—Occupant Capacity

The maximum occupant capacity of buildings or structures of Group I Occupancy and areas or portions and specified occupancy uses thereof, and the capacity of exitways or corridors, stairways, doors and exits or units thereof, and the distance of travel to exit, shall not exceed the capacity and distance specified in this Code and in Table No. 410-G.

Table No. 410-G
Maximum Occupant Capacity—Group I

Occupant Use	Occupant Capacity Sq. Ft. per Occupant	Travel to Exit (feet)	Number of Occupants per 22" Unit Width			
			Pas-ways	Stairs	Doors	Exits to exterior
Assembly—outside:						
Assembly areas—						
with seating	6	75	250	200	200	250
no seating	15	75	250	200	200	250
Bleachers	6	75	250	200	200	250
Grand stands	6	75	250	200	200	250
Stadiums	6	75	250	200	200	250
Drive-in Theatres						
Locker rooms	100	100	60	40	60	
Restaurants and concession stands	20	75			80	
Minimum width in inches			84	84	84	84

410.092—Exitways

Exitways and units thereof, shall be provided buildings or structures of Group I Occupancy and areas or portions and specified occupancy uses thereof, of such capacity, width and number as determined by the occupant capacity of the building, tributary occupancy loads, areas and heights and distance of travel to exit as provided in this Code and this section.

Reference: Subsection 401.092.

Exitways leading into or through kitchens, bakeries or concession areas, or through service, storage or hazardous

areas, or pressing or locker rooms, shall not be included in the required number of exitways.

Ramps of a slope not greater than (1) in eight (8) may be substituted for required exitways and the occupant capacity and widths of ramps shall not be less than required for exitways.

Exitways and units thereof, except aisles and cross aisles from areas used for audiences and spectators shall be not less than eighty-four (84) inches in width and shall lead directly toward an exit to the exterior at grade level and there shall be not less than two (2) exitways from the structure and not less than one (1) exitway for each two thousand (2000) occupants or fraction thereof.

Exitways from areas of assembly shall be located not more than one hundred (100) feet apart and travel to such exitway shall not exceed seventy-five (75) feet from any area or seat.

Exitways and units thereof shall be provided with such lighting and illuminated signs as required by this Code.

410.093—Corridors

Corridors of buildings or structures of Group I Occupancy and passageways serving as a means of egress to the exterior of the building, shall be of such capacity and width as determined by the occupant capacity and tributary occupant loads of the building and areas or portions thereof.

Passageways serving as exitways or corridors from areas of assembly shall be not less in unobstructed width and height than eighty-four (84) inches.

Passageways, corridors and stairs serving as exitways from areas of assembly shall discharge at grade level within seventy-five (75) feet of unobstructed travel distance to an exit to the exterior.

Corridors of areas to which the public does not have access and serving a tributary occupant load of less than fifty (50) may be not less than forty-four (44) inches in width.

Concession stands shall not open upon corridors or passageways used as exitways.

410.094—Stairways

Stairways of buildings of Group I Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than required for floor area per story for each stairway as specified in Table No. 410-H.

Stairways shall be not less than eighty-four (84) inches

in width; except, stairways serving areas of the building to which the public does not have access and a tributary occupant load of less than fifty (50) may be thirty-six (36) inches in width.

Table No. 410-H
Required Stairways based on Area per Story—Group I

Heights in Stories	Area per Story per Stairway in Sq. Ft. Type of Construction	
	I - II	III - IV - V
Not more than 2	9900	9000
Not more than 3	6600	6000
Not more than 6	6200	5600
More than 6	5500	

Buildings of two (2) or more story levels in height shall be provided with not less than two (2) stairways accessible to all areas of the building.

Stairs used as exitways shall have risers of not more than seven and one-half (7½) inches and treads of not less than ten (10) inches and shall be provided with handrails as specified in this Code.

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types I and II construction for each additional stairway over two (2).

Walls at the outer corners of stairway landings shall be curved on a radius of not less than twenty-four (24) inches, or shall be provided with a forty-five (45) degree splay not less than twenty (20) inches in width.

410.095—Doors and Doorways

Doorways of buildings of Group I Occupancy used as units of exitways shall be of such capacity and widths as determined by the occupant capacity and tributary occupant loads of the building and areas or portions and specified occupancy uses thereof, and doorways shall be not less than eighty-four (84) inches in width.

Doors may be used in doorways as single or multiple units as necessary to gain required widths, and no single door shall be less than thirty-six (36) inches or more than fifty-four (54) inches in width.

Doorways serving non-hazardous areas to which the public does not have access and of a tributary occupant capacity of less than fifty (50) may be thirty-six (36) inches in width.

Doorways of concession stands or restaurants to which the public has access shall open to grade level within seventy-five

(75) feet of unobstructed travel distance to an exit to the exterior, and such doorways shall be not less than sixty (60) inches in width and total widths of required doorways shall be determined by capacity of not more than eighty (80) occupants for each twenty-two (22) inch unit of width.

Doors of locker or service rooms or areas opening into exitways or corridors may open inward and shall be of Class C or of solid wood not less than one and three-quarters ($1\frac{3}{4}$) inches in thickness.

Doors of kitchens or service areas opening into public dining areas shall be of Class C or of solid wood not less than one and three-quarters ($1\frac{3}{4}$) inches in thickness.

410.096—Exits to the Exterior

Exits to the exterior of buildings of Group I Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than specified herein.

1000 or more occupants

Three (3) exits

10 to 1000 occupants

Two (2) exits

Each 2000

One (1) exit

Exits to the exterior shall be located at grade level and shall be not less than eighty-four (84) inches in clear width and shall be not more apart than one hundred (100) feet measured along the exterior wall or enclosure.

The total required widths of exits to the exterior from the building and areas or portions thereof, shall be equally divided among the required number and, except, as provided in this Code, exits shall be not farther apart than twice the specified distance of travel to exit.

The main exit to the exterior shall discharge at grade level upon a publicway, public alley or street of not less than twenty (20) feet in width and additional required exits shall discharge upon a yard, court, or open space of not less in width than the width of any exitway discharging thereto and leading directly to a publicway, public alley or street and such exits may discharge into an enclosed passageway to the street of not less in fire-resistive construction than the structure.

410.097—Floor Levels

Floors of areas used for seating of audiences or spectators may be sloped not to exceed forty-five (45) degrees from horizontal, and such floors shall be terraced at each row of seats, and the floor between each row of seats shall be level.

410.098—Aisles and Seating

Areas of structures used for seating of audiences or spec-

tators shall have aisles and seatings as provided herein.

Seats shall be not less than eighteen (18) inches in width, and rows of seats shall be not less than thirty (30) inches apart measured back to back; except, seats or benches without backs may be twenty-six (26) inches back to back.

There shall be not more than twenty (20) seats in any row between aisles and each such row or portion thereof shall be served by two (2) aisles.

Aisles shall be not less than thirty-six (36) inches in width and shall extend from the front portion of the seating area to the rear and shall discharge into an exitway or cross aisle leading to such exitway.

Aisles of a slope not greater than one (1) in five (5) may be ramped and such ramps shall be provided with a non-slip surface.

Aisles of a slope greater than one (1) in five (5) shall be provided with stairs not less in width than the width of the aisle and with risers of not more than seven and one-half ($7\frac{1}{2}$) inches and treads of not less than ten (10) inches.

Cross aisles extending the full width of the seating area of not less than forty-eight (48) inches in level width shall be provided each twenty (20) rows of seats and cross aisles shall be not more than forty (40) rows of seats apart, and shall intercept each aisle and discharge into an exitway leading to an exit to the exterior.

Cross aisles or rows of seats paralleling a verticle drop in floor level of more than eight (8) inches shall be provided with railings.

410.10—Vertical Openings

Vertical openings in buildings or structures of Group I occupancy shall be enclosed as provided in this Code and this section.

Reference: Section 410.10.

Stairways or ramps leading to seating areas of stadiums, grandstands or bleachers may be unenclosed; except, stairways or ramps leading to areas more than twenty (20) feet above grade shall be of non-combustible construction with all supporting structural members thereof protected by not less than one-hour fire-resistive construction.

Stairways or ramps leading to storage areas, dressing or locker rooms shall be enclosed.

410.11—Light, Ventilation and Sanitation

Buildings or structures of Group I Occupancy and rooms, areas or portions thereof, accessible to the public and used for assembly purposes shall have floors and ceilings of not less in area and height than specified herein and shall be provided with sanitation facilities, light and ventilation as

specified in this section.

Reference: Section 401.11.

410.111—Ceiling Heights, Room Areas, Light and Ventilation

Minimum ceiling heights and floor areas of rooms and specified areas and the percentage of area required to be open for ventilation of closed areas shall be as provided in this Code for occupancies of similar character.

Artificial lighting and automatic ventilating systems may be substituted for natural light and ventilation, and ventilating system where required or used in lieu of windows shall be of the class specified and as defined in this Code.

Reference: Subsection 401.111.

410.112—Sanitation Facilities

Buildings shall be provided with not less than one (1) toilet room on each floor for each sex and each toilet room shall contain not less than one (1) water closet and one (1) lavatory, and each building and area or portion of specified occupancy use thereof, shall have in addition not less than one (1) toilet room for each sex equipped as determined by the occupant capacity of the building or area as provided in Table No. 410-J.

Reference: Subsection 401.113.

Table No. 410-J

Required Equipment of Toilet Rooms—Group I

Number of Occupants	No. of Lavatories	No. of Water Closets		No. of Urinals Male
		Female	Male	
Each 125		1		
Each 150				1
Each 200			1	
Each 250	1			

410.12—Heating Equipment and Installation

Heating units or apparatus generating heat, chimneys, boiler or furnace rooms and special appliances or equipment for heating buildings or structures of Group I Occupancy shall be installed, located or constructed as provided in this Code and this section.

Reference: Section 401.12.

410.13—Storage and Special Hazards

Areas or portions of buildings of Group I Occupancy shall not be used for storage, service or special hazard uses, and such storage as is permitted shall be as provided in this Code.

Reference: Section 401.13.

Storage of combustible or explosive material or products shall not be permitted.

Equipment and removable seating may be stored in areas separated from assembly areas by not less than one-hour fire-resistive construction.

410.14—Fire Protective Equipment

Fire protective equipment where required or installed in buildings or structures of Group I Occupancy shall be of approved type and shall be installed as provided in this Code and this section.

Reference: Section 401.14.

Alarm systems shall be required in all enclosed areas.

Automatic sprinkler systems shall be required in all areas below assembly or seating areas used as storage, work or maintenance rooms, and, except in structures of type I construction, in all enclosed occupied space and over all stairways or exitways.

Interior wet standpipes shall be required in buildings or structures of more than one thousand (1000) occupant capacity.

410.15—Special Equipment

Special apparatus, equipment or appliances installed in buildings or structures of Group I Occupancy and becoming an integral part or portion of the structure and affecting the occupants thereof, shall be installed, located or constructed as provided in this Code and this section and subsections.

Reference: Section 401.15.

CHAPTER 411

GROUP J

STAGE OCCUPANCY

411.01—Group J Occupancy Defined

Group J Occupancy shall include buildings or structures and areas or portions thereof used in connection with assembly occupancies in the presentation of entertainment features, demonstrations or theatrical plays and utilizing scenery, drops, decorations or other artificial effects and opening upon an assembly area for viewing of presentations by an audience, and shall include:

Stages**Raised Platforms****Enclosed Platforms**

Reference: Subsection 401.016.

Reference: Chapter 401—General occupancy requirements.

Division J-1 shall include Stages, defined herein as an area with a depth from the assembly separation to the rear of the stage area of more than twenty (20) feet and separated from the assembly area by not less than four-hour fire-resistive construction, with the viewing opening protected by a required proscenium curtain rising more than ten (10) feet above the stage floor and more than fifty (50) per cent of the height of the viewing opening.

Stages shall be used with indoor assembly occupancies of more than three hundred (300) occupancy capacity.

Division J-2 shall include Enclosed Platforms, defined herein as an area with a depth from the assembly separation to the rear of the platform area of not more than twenty (20) feet and where the ceiling over the stage area is not more than five (5) feet above the top of the viewing opening.

Enclosed platforms may be used with indoor assembly occupancies of not more than three hundred (300) occupant capacity and for outdoor assembly and churches.

Division J-3 shall include Raised Platforms, defined herein as an open platform located within the assembly area of either permanent or movable construction and employing no artificial effects other than a backdrop of fire proofed material.

411.02—Type of Construction

Buildings of Group J Occupancy shall be of the following Types of construction:

Division J-1, stages, shall be of Type I construction.

Division J-2, enclosed platforms, shall be of Types I, II, III or IV construction.

Reference: Article V.

Buildings shall be of not less than one-hour fire-resistive construction throughout.

411.021—Division I Requirements

Buildings of Division I, Stage Occupancy, shall be considered a distinct and separate structure from the adjoining Assembly Occupancy.

Floors of stage area extending the width of the viewing opening and the depth of the stage may be constructed of steel or heavy timber, with flooring of wood not less than two (2) inches nominal thickness with opening therein equipped with tight fitting trap doors of wood of not less than two (2) inches nominal thickness, and no portion of the combustible floor construction shall extend beyond or through the viewing opening.

Stage areas shall be separated from assembly areas by a proscenium wall of not less than four-hours fire-resistive construction and such wall shall extend not less than four (4) feet above the roof of the assembly area, and may contain such openings as specified herein.

The main or viewing opening of stage areas shall be protected by a self closing fire-resistive proscenium curtain as provided in this Code.

Stage areas may have one opening at each side of the viewing opening to the assembly area at stage floor level, and one opening at the orchestra pit level and such opening shall be of not more than twenty-five (25) square feet in area each and shall be protected on each side by a one-hour fire-resistive door.

411.022—Division 2 Requirements

Buildings or structures of Division 2, Enclosed Platforms may be constructed as an area or portion of the adjoining Assembly Occupancy.

Walls, ceilings and floors of enclosed platforms shall be of not less than two-hours fire-resistive construction with openings therein protected by fire doors as required in this Code.

Reference: Subsection 401.053.

Areas of enclosed platforms shall not be used for storage, work or maintenance rooms or dressing rooms; except movable seating of assembly may be stored in areas of enclosed platforms.

When scenery, drops or artificial effects or decorations are used the viewing opening shall be protected by a self-closing tight fitting fire-proof screen or curtain.

Usable space below areas of enclosed platforms shall have ceilings of not less than one-hour fire-resistive construction.

Floors of areas of enclosed platforms shall contain no openings.

411.023—Division 3 Requirements

Raised platforms may be used with assembly occupancies and may be of stationary or removable type construction and shall not be enclosed in any manner and artificial effects or scenery shall not be utilized; except, a backdrop of treated fire-proofed material may be used.

The floor of raised platforms shall not be more than thirty-six (36) inches above the floor level of the assembly, and area under the floor of raised platforms shall not be used for storage or other purposes.

Structural members shall be of heavy timber or incombustible framing and floors shall be of tight-fitting tongue and groove flooring of not less than one (1) inch in thickness and shall contain no openings.

411.03—Fire District Requirements

Buildings of Group J Occupancy of Types IV or V construction shall not be permitted in Fire Zone I.

Reference: Article III.

411.04—Design and Loading

Buildings of Group J Occupancy and areas or portions thereof of specified occupancy uses shall be designed for unit live loads of pounds per square foot of floor area as provided in this Code and this Section, and as specified in

Table No. 411-A
Unit Live Loads—Group J

Occupancy Use	Pounds per sq. ft.
Catwalks	75
Corridors	40
Dressing room areas	50
Enclosed platforms	100
Loading docks	250
Offices	50
Raised platforms	100
Rest rooms	50
Shipping rooms	150
Stage-	
Floors	125
Areas	100
Stairways	100
Storage-	
Light	100
Heavy	250

Table No. 411-A.

Reference: Chapter 601.

411.05—Mixed Occupancy Separation

Buildings of Group J Occupancy and areas or portions thereof, except as specified in this Chapter, shall be separated from specified areas and other occupancies of the same building by an occupancy separation of not less than four-hours fire-resistive construction.

Reference: Subsection 401.053.

Table No. 411-B**Mixed Occupancy Separations—Group J**

Group Occupancy	-H-												
	A	B	C	D	E	F	G	1	2	I	J	K	L
Separation in hours	4	4	4	4	4	4	4	4	4	4	x	4	4

Dressing room areas, work rooms, storage and other areas shall be separated from stage areas and each other by not less than two-hour fire-resistive construction.

Dressing rooms shall be separated from each other by not less than one-hour fire-resistive construction.

Storage shall not be permitted in stage areas except storage of scenery or stage equipment.

Removable seating equipment of assembly buildings may be stored in areas of enclosed platforms.

411.06—Allowable Floor Area

Buildings or structure of Group J Occupancy shall not exceed the floor areas in square feet per story specified in this section and in Table No. 411-C.

Table No. 411-C**Allowable Floor Area—Group J**

Type of Construction	I	II	III	IV	V
Fire Zone I	2400	1200	900	NP	NP
II	2400	1200	900	900	NP
Outside Fire District	2400	1200	900	900	NP

The aggregate area of stages and stage areas or areas of enclosed platforms shall not exceed twenty-five (25) per cent of the combined total area of the assembly and stage or enclosed platform.

Allowable floor areas as specified in Table No. 411-C may be increased as provided herein and in Table No. 411-D, and when applicable, increases in percentage of floor area per story as specified for limited heights, automatic sprinkler systems and excess exposure distances may be compounded; except, increases shall not be allowed for automatic sprink-

ler systems where required by other provisions of this Code.

Table No. 411-D

Allowable Increases in Floor Area—Group J

Allowable Increases	No. Stories	Percentage of Increase Type of Construction				
		I	II	III	IV	V
Limited Heights— not more than	3	40	40	40	40	
Sprinkler system— more than	2		200	200	200	
not more than	1		300	300	300	

Excess Exposure Distance—Reference: Subsection 401.062.

411.07—Limiting Heights

Buildings of Group J Occupancy shall not exceed the limiting heights in stories or the maximum height in feet specified in this section and in Table No. 411-E.

Table No. 411-E

Limiting Heights in Stories—Group J

Types of Construction	I	II	III	IV	V
Fire Zone I	UL	3	2	NP	NP
II	UL	3	2	2	NP
Outside Fire District	UL	3	2	2	NP
Maximum Ht. in Feet	UL	65	45	45	NP

Limiting heights of buildings of Group J Occupancy shall not exceed the height of the attached assembly building by more than one (1) story or fifteen (15) feet.

Limiting heights of buildings of Group J Occupancy may be increased as provided herein; except, increases shall not be allowed for automatic sprinkler systems when required by other provisions of this Code, or when increases in area have been allowed for such equipment.

411.08—Exterior Walls and Protection of Openings

Exterior bearing walls or portions of such walls and allowable openings therein, of buildings of Group J Occupancy located less than the specified exposure distance from adjacent property lines shall be of not less in fire-resistive construction than specified in this section and in Table No. 411-F.

Buildings shall face upon a street, public way, court or passageway in not less than the two opposite sides of the stage area and such exterior walls shall contain exits at grade level to the exterior of the building as provided in this Chapter.

Reference: Section 411.09.

Table No. 411-F
Fire-Resistance of Exterior Bearing Walls
and Protection of Openings—Group J

Type of Const.	Exposure Distance in feet	Exterior Walls					
		Construction in hours			Protection of Openings in hours		
Fire Zones—		I	II	O	I	II	O
I	Less 3				NP	NP	NP
	Minimum	4	4	4	1	1	1

NP—Not Permitted. INC—Incombustible.

No openings in exterior walls except exits shall be permitted.

Buildings shall not be closer than eighty-five (85) feet to gasoline service stations, storage of inflammable liquids or buildings of Group L Occupancy.

411.09—Occupant Capacity and Exitways

The occupant capacity of buildings or structures of Group J Occupancy and areas or portions and specified occupancy uses thereof, and the required number, width and capacity of exitways or units thereof, shall be as provided in this Code and as specified in this section and subsections.

Reference: Section 401.09.

Exitways shall include corridors, lobbies, foyers, arcades, aisles, stairs, ramps, landings, doors, vestibules, exits or other areas serving in whole or in part as a required means of travel to an exit to the exterior of the building, and exits

Table No. 411-G
Maximum Occupant Capacity—Group J

Occupant Use	Occupant Capacity Sq. Ft. per Occupant	Travel to Exit (feet)	Number of Occupants per 22" Unit Width			
			Corridor	Exit Stairs	Exit Doors	Exits to exterior
Stages:						
Stage areas	150	75	40	30	40	50
Dressing rooms	80	75	40	30	40	50
Storage areas	150	100	40	30	40	50
Work rooms	100	100	40	30	40	50
Locker rooms	80	100	40	30	40	50
Enclosed platforms	100	75	40	30	30	50
Minimum width in inches			44	44	36	72

to the exterior shall terminate upon a publicway, public alley or street, or upon a yard, court or open space with direct access to a publicway, public alley or street.

411.091—Occupant Capacity

The maximum occupant capacity of buildings or structures of Group J Occupancy and areas or portions and specified occupancy uses thereof, and the capacity of exitways or corridors, stairways, doors and exits or units thereof, and the distance of travel to exit, shall not exceed the capacity and distance specified in this Code and in Table No. 411-G.

411.092—Exitways

Exitways and units thereof, shall be provided buildings or structures of Group J Occupancy and areas or portions and specified occupancy uses thereof, of such capacity, widths and number as determined by the occupant capacity, tributary occupant loads, areas and heights and distance of travel to exit as provided in this Code and this section.

Reference: Subsection 401.092.

Buildings of stage occupancy shall have not less than two (2) exitways accessible to all areas of the building and leading directly to an exit to the exterior of the building, and one (1) such exit to the exterior shall be located on each side of the stage platform area.

Enclosed platforms constructed within or as a part of assembly occupancies shall have not less than one (1) exit to the exterior of the building located within the enclosed area, and shall have access to not less than one (1) exit to the exterior on each side of the platform area, and not farther from any area of the platform than the specified distance of travel to exit.

Areas above or below the stage floor, used for other than storage shall have access to not less than two (2) exits.

411.093—Corridors

Corridors of buildings of Group J or Stage Occupancy shall be of such capacity and width as determined by the occupancy capacity and tributary occupant load of the building and areas or portions thereof, and shall be not less than forty-four (44) inches in width.

Balconies serving tiers of dressing rooms as exitways shall be considered as corridors and may be of open incombustible construction and shall be not less in width than one and one-half (1½) times the width of doors of dressing rooms opening thereupon, and each such balcony shall be served by not less than two (2) stairways.

411.094—Stairways

Stairways of buildings of Group J Occupancy shall be of such capacity, width and number as determined by the oc-

cupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than required for floor area per story for each stairway as specified in Table No. 411-H.

Table No. 411-H
Required Stairways based on Area per Story—Group J

Heights in Stories	Area per Story per Stairway in Sq. Ft. Type of Construction	
	I - II	III - IV
Not more than 2	5000	4500
Not more than 3	3300	3000
Not more than 6	3000	
More than 6	2750	

Stairways shall be of not less than forty-four (44) inches in width; except, stairways serving a tributary occupant load of less than fifty (50) occupants may be reduced to thirty-six (36) inches in width, and open stairways serving balconies or tiers of dressing rooms of an occupant capacity of not more than twenty (20) may be reduced to thirty (30) inches in width.

Buildings of two (2) or more stories in height shall be provided with not less than two (2) stairways accessible to all areas of the building.

Fly galleries shall be provided with one (1) stairway of not less than thirty (30) inches in width.

One (1) of the required stairways serving balconies of dressing rooms may be a circular or winder type stairway and the average width of the treads shall not be less than eight (8) inches.

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types I and II construction for each additional stairway over two (2).

One (1) of the required stairways of buildings of three (3) or more stories in height shall be a smokeproof tower of approved design and construction.

Reference: Subsection 401.14.

Ramps with a slope not greater than one (1) in eight (8) may be substituted for required stairways; and such ramps shall be not less in width than the required stairway.

411.095—Doors and Doorways

Doorways of buildings of Group J Occupancy used as units of exitways shall be of such capacity and widths as deter-

mined by the occupant capacity and tributary occupant loads of the building and areas or portions and specified occupancy uses thereof.

Doors may be used in doorways as single or multiple units as necessary to gain required widths, and no single door shall be less than thirty-six (36) inches or more than fifty-four (54) inches in width.

Doorways serving non-hazardous areas to which the public does not have access and of a tributary occupant capacity of less than ten (10) may be thirty (30) inches in width.

Doors of dressing rooms or service areas opening upon balconies or corridors shall be of Class C or solid wood not less than one and three-quarters ($1\frac{3}{4}$) inches in thickness and may open inward.

Dressing rooms occupied by ten (10) or more occupants shall have not less than two (2) doors opening upon a corridor with access to the exterior of the building and such doors shall be arranged a distance apart of not less than one-fifth ($1/5$) of the perimeter of the room.

411.096—Exits to the Exterior

Exits to the exterior of building of Group J Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than specified herein.

Over 200 occupants

Three (3) exits

10 to 200 occupants

Two (2) exits

Exit doorways to the exterior shall be not less than seventy-two (72) inches in clear width exclusive of door framing and doors shall swing to the full width, and exits shall be not less in width than the total required widths of exitways discharging thereto.

Buildings of stage occupancy shall have not less than two (2) exits to the exterior of the building and one (1) shall be located on each side of the stage area.

The total required widths of exits to the exterior from the building and areas or portions thereof, shall be equally divided among the required number and, except, as provided in this Code, exits shall be not farther apart than twice the specified distance of travel to exit.

Exits to the exterior of the building shall discharge directly upon a street or public way or upon a court or yard not less in width than the required widths of exitways discharging thereupon and not less than seventy-two (72) inches and directly connected to a street or public way by a passageway not less in width than the required width of the court or

Section 411.10**Vertical Openings**

yard and not less than seven (7) feet in height with no obstructions.

411.10—Vertical Openings

Vertical openings in buildings of Group J Occupancy shall be enclosed as provided in this Code and this section.

Reference: Section 401.10.

Stairways leading from the ground or stage floor level to areas above or below shall be enclosed; except, stairs of non-combustible construction serving fly galleries and open balconies of tiers of dressing rooms may be unenclosed.

411.11—Light, Ventilation and Sanitation

Buildings or structures of Group I Occupancy and rooms or areas or portions thereof, shall have floors and ceilings of not less in area and height than specified herein and shall be provided with sanitation facilities, light and ventilation as specified in this section.

Reference: Section 401.11.

411.111—Ceiling Heights, Room Areas, Light and Ventilation

Minimum ceiling heights and floor areas of rooms and specified areas and requirements for ventilation shall be as provided in this subsection and in Table No. 411-I.

Artificial lighting and automatic ventilating systems may be substituted for natural light and ventilation, and where required or substituted ventilating systems shall be of the class specified in Table No. 411-1 and as defined in this Code.

Reference: Subsection 401.111.

Table No. 411-I

**Minimum Ceiling Heights, Room Area and Window Area
Group J**

Occupancy Use	Ceil- ing Height feet	Floor Area sq. ft.	Window		Venti- lating System Class
			Area %	Open- ing %	
Dressing rooms	8	100	xx	xx	II

Table No. 411-J

Required Equipment of Toilet Rooms—Group J

Number of Occupants	No. of Lava- tories	No. of Water Closets		No. of Urinals Male
		Female	Male	
Each 15	1	1		
Each 20			1	1

411.112—Sanitation Facilities

Buildings shall be provided with not less than one (1) toilet room on each floor for each sex and each toilet room shall contain not less than one (1) water closet and one (1) lavatory, and each building and area or portion of specified occupancy use thereof, shall have in addition not less than one (1) toilet room for each sex equipped as determined by the occupant capacity of the building or area as provided in Table No. 411-J.

Reference: Subsection 401.113.

411.12—Heating Equipment and Installation

Heating units or apparatus generating heat, chimneys, boiler or furnace rooms and special appliances or equipment for heating buildings of Group J Occupancy shall be installed, located or constructed as provided in this Code and this section.

Reference: Section 401.12.

Heating units or apparatus generating heat shall not be installed, located or constructed within stages or areas of enclosed platforms.

411.13—Storage and Special Hazards

Areas or portions of buildings of Group J Occupancy shall not be used for storage, service or hazard uses, and such storage as is permitted shall be as provided in this Code.

Reference: Section 401.13.

Storage of combustible or explosive material or products shall not be permitted.

Equipment and scenery may be stored in stage areas and such storage areas shall be separated from other areas by not less than one-hour fire-resistive construction.

Equipment of assembly and removable seating may be stored in areas of enclosed platforms.

411.14—Fire Protective Equipment

Fire protective equipment where required or installed in buildings of Group J Occupancy shall be of approved type and shall be installed as provided in this Code and this section.

Reference: Section 401.14.

Alarm systems shall be required in all areas of stage occupancy.

Automatic sprinkler systems shall be required in all areas of stages located back of the proscenium separation, and a line of sprinklers shall be located immediately back of the proscenium opening and not more than five (5) feet above the top of the arch, and areas of dressing rooms, store rooms, property rooms, shops, work rooms and passageways, and

Section 411.15

Special Equipment

below the stage floor and under all fly and tie galleries shall be sprinkled.

Interior wet standpipes shall be required in all areas of stages and enclosed platforms and shall extend from the basement to the uppermost portion or level and shall be located at each side of the viewing opening.

411.15—Special Equipment

Special apparatus, equipment or appliances installed in buildings of Group J Occupancy and becoming an integral part or portion of the structure and affecting the occupants thereof, shall be installed, located or constructed as provided in this Code and this section and subsections.

Reference: Section 401.15.

411.151—Stage Ventilation

Stage areas shall be equipped with one or more ventilators constructed of incombustible materials located above the stage floor of not less in ventilating area than twenty (20) per cent of the floor area of the stage building and installed as provided in this Code.

411.152—Switchboards

Switchboards of stages and enclosed platforms shall be provided with a protective hood of non-combustible materials extending over the full length of the switchboard.

CHAPTER 412
GROUP K
INDUSTRIAL OCCUPANCY

Non-Hazardous

12.01—Group K Occupancy Defined

Group K Occupancy shall include buildings or structures, and areas or portions thereof, of manufacturing, industrial and business occupancy of a non-hazardous nature, and shall include:

Non-hazardous	Cold Storage Plants
Manufacturing	Creameries
Storage of Non-	Coal Pockets
combustibles	Printing Plants
Freight Depots	Ice Plants
Power Plants	Pumping Stations

Reference: Subsection 401.016.

Reference: Chapter 401—General occupancy requirements.

12.02—Type of Construction

Buildings of Group K Occupancy may be of Types I, II, III, IV or V construction.

Reference: Article V.

Buildings of more than three thousand (3000) square feet in floor area per story above the second story or of four (4) stories or more in height shall be of not less than one-hour fire-resistive construction throughout; except, interior partitions of non-hazardous areas, commercial units or other distinct occupancies may be of less fire-resistive construction.

12.03—Fire District Requirements

Buildings of Group K Occupancy of Type V construction shall not be permitted within the Fire District.

Reference: Article III.

Buildings of Types III and IV located within the Fire District shall be of not less than one-hour fire-resistive construction throughout.

12.04—Design and Loading

Buildings of Group K Occupancy and areas or portions thereof of specified occupancy uses shall be designed for unit live loads of pounds per square foot of floor area as provided in this Code and this Section, and as specified in Table No. 412-A.

Reference: Chapter 601.

Unit live loads of occupancy uses not specified in this Section shall be determined on the basis of occupancies of similar character.

Floors of areas where partitions are subject to be relo-

cated shall be designed to support in addition to specified loads, a uniformly distributed load equal to twenty (20) pounds per square foot.

Table No. 412-A
Unit Live Loads—Group K

Occupancy Use	Pounds per sq. ft.
Corridors and aisles	100
Foyers and lobbies	100
Freight depots	250
Loading docks	250
Loft buildings	100
Manufacturing—	
Light	75
Heavy	125
Power plants and boiler rooms	250
Offices	50
Printing plants—	
Press rooms	150
Linotype rooms	100
Composing rooms	100
Rest and locker rooms	50
Stairways and ramps	100
Shipping rooms	150
Storage—	
Light	125
Heavy	250

Floors of areas subject to superimposed loads by installation of equipment or machinery, placing, displaying, or storage of material or merchandise, shall be designed to support in all affected areas in addition to specified design loads, one and one-half (1½) times the concentrated superimposed load.

412.05—Mixed Occupancy Separation

Buildings of Group K Occupancy and areas or portions thereof, shall be separated from specified areas and other occupancies of the same building by an occupancy separation of not less in hours of fire-resistive construction than specified in this section and in Table No. 412-B.

Reference: Subsection 401.053.

Table No. 412-B
Mixed Occupancy Separations—Group K

Group Occupancy	Group A													
	A	B	C	D	E	F	G	-H-	I	J	K	L	M	
Separation in hours	2	2	2	2	2	3	2	3	2	2	4	x	4	2

Kitchens, bakeries and service areas supplying food to dining areas, cafeterias or commissaries shall be separated from adjoining areas by not less than one-hour fire-resistive construction.

412.06—Allowable Floor Area

Buildings of Group K Occupancy shall not exceed the floor areas in square feet per story specified in this section and in Table No. 412-C.

Table No. 412-C
Allowable Floor Area—Group K

Type of Construction	I	II	III	IV	V
Fire Zone I	UL	6300	4200	1500	NP
II	UL	7200	4800	4500	NP
Outside Fire District	UL	9000	6000	7200	3600

Allowable floor areas as specified in Table No. 412-C may be increased as provided herein and in Table No. 412-D, and when applicable, increases in percentage of floor area per story as specified for limited heights, one-hour fire-resistive construction, automatic sprinkler system and excess exposure distances may be compounded; except, increases shall not be allowed for one-hour fire-resistive construction or automatic sprinkler systems where required by other provisions of this Code.

Table No. 412-D
Allowable Increases in Floor Area—Group K

Allowable Increases	No. Stories	Percentage of Increase Type of Construction				
		I	II	III	IV	V
Limited Heights— not more than	3	UL	40	40	40	40
	2		75	75	75	75
One-hour Constr.-	x		50	50	50	x
Sprinkler system— more than	2		200	200	200	x
	1		300	300	300	

Excess Exposure Distance—Reference: Subsection 401.062.

Allowable areas shall not be limited in buildings of not more than two (2) stories in height, provided, the building is equipped with an approved automatic sprinkler system and exterior walls are not less than sixty (60) feet from adjacent property lines on one hundred (100) per cent of the perimeter of the building.

Allowable areas shall not be limited in buildings of Types

II and IV construction of not more than one (1) story height, provided, exterior walls are not less than sixty (60) feet from adjacent property lines on one hundred (100) percent of the perimeter of the building.

412.07—Limiting Heights

Buildings of Group K Occupancy shall not exceed the limiting heights in stories or the maximum height in feet specified in this section and in Table No. 412-E.

Table No. 412-E
Limiting Heights in Stories—Group K

Types of Construction	I	II	III	IV	V
Fire Zone I	UL	4	2	1	NP
II	UL	4	2	2	NP
Outside Fire District	UL	5	3	3	2
Maximum Ht. in Feet	UL	85	55	65	45

Limiting heights as specified in Table No. 412-E may be increased as provided herein; except, increases shall not be allowed for one-hour fire-resistive construction throughout or automatic sprinkler systems where required by other provisions of this Code, or when increases in area have been allowed for such construction or equipment.

Limiting heights may be increased by one (1) story, or fifteen (15) feet, in buildings of Types III, IV or V of one-hour fire-resistive construction throughout, or when equipped with an approved automatic sprinkler system.

412.08—Exterior Walls and Protection of Openings

Exterior bearing walls or portions of such walls and allowable openings therein, of buildings of Group K Occupancy located less than the specified exposure distance from adjacent property lines shall be of not less in fire-resistive construction than specified in this section and in Table No. 412-F.

Buildings shall face upon a yard, open space, court, street or public way of such size and width to provide an exposure distance of not less than twenty (20) feet in the entire length of one (1) exterior wall, and such exposed exterior wall shall contain the main entrance and exit of the building at grade level.

412.09—Occupant Capacity and Exitways

The occupant capacity of buildings or structures of Group K Occupancy and areas or portions and specified occupancy uses thereof, and the required number, width and capacity of exitways and units thereof, shall be as provided in this Code and as specified in this section and subsections.

Reference: Section 401.09.

Table No. 412-F
Fire-Resistance of Exterior Bearing Walls
and Protection of Openings—Group K

Type of Const.	Exposure Distance in feet	Exterior Walls					
		Construction in hours			Protection of Openings in hours		
		Fire Zones—					
		I	II	O	I	II	O
I	Less 3				NP	NP	NP
	Less 30		4	4			
	Less 50	4					
	Minimum	INC	INC	INC	1	1	1
II	Less 3				NP	NP	NP
	Minimum	4	4	4	1	1	1
III	Less 3				NP	NP	NP
	Less 10					1	1
	Less 20				1		
	Minimum	4	4	4			
IV	Less 3	4	4	1	NP	NP	NP
	Less 5						1
	Less 10	2	2			1	
	Less 20				1		
	Minimum	1	1				
V	Less 3			1			NP
	Less 5						1

NP—Not Permitted. INC—Incombustible.

Exitways shall include corridors, lobbies, foyers, arcades, aisles, stairs, ramps, landings, doors, vestibules, exits or other areas serving in whole or in part as a required means of exit travel to the exterior of the building, and exitways shall terminate upon a publicway, public alley or street; or upon a yard, court or open space with direct access to a publicway, public alley or street.

12.091—Occupant Capacity

The maximum occupant capacity of buildings or structures of Group K Occupancy and areas or portions and specified occupancy uses thereof, and the capacity of exitways or corridors, stairways, doors and exits or units thereof, and the distance of travel to exit, shall not exceed the capacity and distance specified in this Code and in Table No. 412-G.

Occupant capacity shall be determined based upon specified square feet of area per occupant.

The aggregate total widths of exitways and units thereof,

shall be determined based upon the specified number of occupants and tributary occupant load for each twenty-two (22) inch unit of width, and no single unit shall be less in width than the specified minimum in inches.

Table No. 412-G
Maximum Occupant Capacity—Group K

Occupant Use	Occupant Capacity Sq. Ft. per Occupant	Travel to Exit (feet)	Number of Occupants per 22" Unit Width			
			Corridor & aisles	Exit Stairs	Exit Doors	Exits to exterior
Industry-non hazard:						
Factories	100	150	80	60	80	80
Storage	300	150	80	60	80	80
Warehouses	300	150	80	60	80	80
Offices	100	100	40	30	40	60
Minimum width in inches			44	44	36	54

The number of exitways or units thereof, shall be determined based upon square feet of area served and heights as specified herein, and by distance of travel to exit, and the total required widths shall be equally divided among the required number.

Distance of travel to exit as specified in Table No. 412-G may be increased by fifty (50) per cent in buildings of one-hour fire-resistive construction throughout, and by one-third ($\frac{1}{3}$) in buildings equipped with an approved automatic sprinkler system; except, only one (1) such increase shall be allowed.

The maximum occupant capacity of rooms or areas used as places of employment shall be conspicuously posted by the owner of the building by means of durable metal signs in each such room or area and of such form as approved by the Building Official, and it shall be in violation of this Code to deface or remove such sign or permit more than the legal number of occupants within such room or area.

412.092—Exitways

Exitways and units thereof, shall be provided buildings of Group K Occupancy and areas or portions and specified occupancy uses thereof, of such capacity, widths and number as determined by the occupant capacity of the building, tributary occupant loads, areas and heights and distance of travel to exit as provided in this Code and this section.

Exitways leading into or through service, storage or hazardous areas, or areas of distinct and individual occupancy, shall not be included in the required number of exitways.

Aisles of manufacturing or production areas used as exitways shall be not less in width than two hundred (200) per cent of the required width of corridors based on tributary occupant loads and shall be open area exclusive of areas occupied by machinery or equipment, or for storage or stocking of materials.

Fire corridors may be permitted as exitways in buildings of Group K Occupancy of Types I, II or IV Construction, and shall be of such construction and fire-resistance as provided in this Code.

Exitways of manufacturing or production areas located on other than the ground floor, shall discharge directly to an exit stairway having direct access to a means of egress to the exterior of the building.

The required number of exitways of manufacturing or production areas shall be arranged a distance apart equal to not less than one-fifth (1/5) of the perimeter of the area.

412.093—Corridors

Corridors of buildings of Group K Occupancy shall be of such capacity and width as determined by the occupant capacity and tributary occupant loads of the building and areas or portions thereof, and shall be not less than forty-four (44) inches in width.

412.094—Stairways

Stairways of buildings of Group K Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than required for floor area per story for each stairway as specified in Table No. 412-H.

Table No. 412-H

Required Stairways based on Area per Story—Group K

Heights in Stories	Area per Story per Stairway in Sq. Ft. Type of Construction	
	I - II	III - IV - V
Not more than 2	9900	9000
Not more than 3	6600	6000
Not more than 6	6200	5600
Not more than 12	5800	
More than 12	5500	

Stairways shall be not less than forty-four (44) inches in width; except, stairways serving areas of the building to which the public does not have access and a tributary oc-

cupant load of less than fifty (50) may be thirty-six (36) inches in width.

Buildings of two (2) or more stories in height shall be provided with not less than two (2) stairways accessible from all areas of the building.

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types I and II construction for each additional stairway over two (2).

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types III and IV construction of one-hour fire-resistive construction throughout.

Areas per story as specified for each stairway may be increased by one-third ($\frac{1}{3}$) in buildings of Types I, II, III and IV construction equipped with an approved automatic sprinkler system.

One (1) of the required stairways of buildings of five (5) or more stories in height shall be a smokeproof tower of approved design and construction.

Reference: Chapter 705.

Ramps with a slope not greater than one (1) in eight (8) may be substituted for required stairways; and such ramps shall be not less in width than the required stairway.

412.095—Doors and Doorways

Doorways of buildings of Group K Occupancy used as units of exitways shall be of such capacity and widths as determined by the occupant capacity and tributary occupant load of the building and areas or portions and specified occupancy uses thereof.

Doors may be used in doorways as single or multiple units as necessary to gain required widths, and no single door shall be less than thirty-six (36) inches or more than fifty-four (54) inches in width; except, doors serving non-hazardous areas to which the public does not have access and of a tributary occupant capacity of less than ten (10) may be thirty (30) inches in width.

Exits of manufacturing, or work areas located on other than the ground floor, shall open directly to an exit stairs having direct access to a means of egress to the exterior of the building or upon a corridor having direct access to such exit stairs.

Required exits of manufacturing or work areas shall be arranged a distance apart equal to not less than one-fifth ($\frac{1}{5}$) of the perimeter of the area.

412.096—Exits to the Exterior

Exits to the exterior of buildings of Group K Occupancy shall be of such capacity, width and number as determined by

the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than specified herein.

1000 or more occupants Four (4) exits

500 to 999 occupants....Three (3) exits

10 to 499 occupants.....Two (2) exits

Exit doorways to the exterior shall be not less than fifty-four (54) inches in clear width exclusive of door framing and doors shall swing to the full width, and exits shall be not less in width than the total required widths of exitways discharging thereto.

The total required widths of exits to the exterior from the building and areas or portions thereof, shall be equally divided among the required number and, except, as provided in this Code, exits shall be not farther apart than twice the specified distance of travel to exit.

12.10—Vertical Openings

Vertical openings in buildings of Group K Occupancy shall be enclosed as provided in this Code and this section.

Reference: Section 401.10.

Stairways leading from the ground floor to stories above in buildings of more than two (2) stories in height shall be enclosed.

Stairways leading from the ground floor to basements shall be enclosed.

12.11—Light, Ventilation and Sanitation

Buildings or structures of Group K Occupancy and rooms, areas or portions and specified occupancy uses thereof, accessible to the public or used for industrial purposes and places of employment shall have floors and ceilings of not

Table No. 412-I

Minimum Ceiling Heights, Room Area and Window Area
Group K

Occupancy Use	Ceil- ing Height feet	Floor Area sq. ft.	Window		Venti- lating System Class
			Area %	Open- ing %	
Industry- Production areas					
Main floors	12	100	12	50	II
Upper floors	10	100	12	50	II
Offices	12	100	12	50	II
Toilet rooms	10		10	50	I

less in area and height than specified herein and shall be provided with sanitation facilities, light and ventilation as specified in this section.

Reference: Section 401.11.

412.111—Ceiling Heights, Room Areas, Light and Ventilation

Minimum ceiling heights and floor areas of rooms and specified areas and required window area based on percentage of floor area and the percentage of window area required to open for ventilation shall be as provided in this subsection and in Table No. 412-I.

Artificial lighting and automatic ventilating systems may be substituted for natural light and ventilation, and ventilating systems shall be required as specified in Table No. 412-I and where required or used in lieu of windows shall be of the class specified and as defined in this Code.

Reference: Subsection 401.111.

412.112—Sanitation Facilities

Buildings shall be provided with not less than one (1) toilet room on each floor for each sex and each toilet room shall contain not less than one (1) water closet and one (1) lavatory, and each building and area or portion of specified occupancy use thereof, shall have in addition not less than one (1) toilet room for each sex equipped as determined by the occupant capacity of the building or area as provided in Table No. 412-J.

Reference: Subsection 401.113.

Table No. 412-J
Required Equipment of Toilet Rooms—Group K

Number of Occupants	No. of Lavatories	No. of Water Closets		No. of Urinals Male
		Female	Male	
Less than 25		2		1
25 to 49	1	3	1	2
50 to 99	2	5	2	3
100 or over— each 30		1		
each 60	1		1	1

412.12—Heating Equipment and Installation

Heating units or apparatus generating heat, chimneys, boiler or furnace rooms and special appliances or equipment for heating buildings of Group K Occupancy shall be installed, located or constructed as provided in this Code and this section.

Reference: Section 401.12.

412.13—Storage and Special Hazards

Areas or portions of buildings of Group K Occupancy used for storage purposes shall be as provided in this Code.

Reference: Section 401.13.

Storage of combustible or explosive materials shall be in areas separated from production or work areas housing employees.

412.14—Fire Protective Equipment

Fire protective equipment where required or installed in buildings of Group K Occupancy shall be of approved type and shall be installed as provided in this Code and this section.

Reference: Section 401.14.

Alarm systems shall be required in all usable areas above or below the ground floor and in all buildings of more than ten thousand (10,000) square feet of floor area per story.

Interior wet standpipes shall be required in all buildings of three (3) or more stories in height and in buildings of more than twenty thousand (20,000) square feet of floor area in any story.

412.15—Special Equipment

Special apparatus, equipment or appliances installed in buildings of Group K Occupancy and becoming an integral part or portion of the structure and affecting the occupants thereof, shall be installed, located or constructed as provided in this Code and this section and subsections.

Reference: Section 401.15.

CHAPTER 413
GROUP L
INDUSTRY OCCUPANCY
Hazardous

413.01—Group L Occupancy Defined

Group L Occupancy shall include buildings or structures, and areas or portions thereof, of manufacturing, industrial and business occupancy of a hazardous nature, and shall include:

Dry Cleaning Establishments	Spray Rooms
Storage of Explosive Materials and Liquids	Grain Elevators
Storage of Combustible Materials	Paint Shops
Manufacture of Explosive or Combustible Products	Film Exchange or Storage
Aircraft Repair Hangars	Repair Garages
Wood Working Plants	Furniture Repair and Manufacture
	RR Roundhouses
	High Pressure Boiler Rooms
	Gas Plants

Reference. Subsection 401.016.

Reference: Chapter 401—General occupancy requirements.

413.02—Type of Construction

Buildings of Group L Occupancy may be of Types I, II, III, or IV construction.

Reference: Article V.

Buildings of more than three thousand (3000) square feet in floor area per story above the first story or of three (3) or more stories in height shall be of not less than one-hour fire-resistive construction throughout; except, interior partitions of non-hazardous areas, commercial units or other distinct occupancies may be of less fire-resistive construction.

Columns, beams and girders of structural steel, iron or reinforced concrete in buildings of more than eight (8) stories or eighty-five (85) feet in height shall be protected by not less than four-hour fire-resistive construction, and floors shall be of not less than three-hour fire-resistive construction.

Floors of repair garages, aircraft hangars or buildings in which flammable or explosive liquids are used or stored shall be of incombustible construction and protected against saturation.

413.03—Fire District Requirements

Buildings of Group L Occupancy shall not be permitted in Fire Zone I.

Reference: Article III.

Buildings of Types III and IV located within the Fire District shall be of not less than one-hour fire-resistive construction throughout.

413.04—Design and Loading

Buildings of Group L Occupancy and areas or portions thereof of specified occupancy uses shall be designed for unit live loads of pounds per square foot of floor area as provided in this Code and this Section, and as specified in Table No. 413-A.

Reference: Chapter 601.

Table No. 413-A
Unit Live Loads—Group L

Occupancy Use	Pounds per sq. ft.
Aircraft repair hangars	150
Auto repair shops	100
Balconies-	
Exterior	100
Interior	40
Corridors and aisles	100
Dry cleaning plants	75
Gas plants	125
Grain elevators	250
High pressure boiler rooms	250
Loading docks	250
Lobbies and foyers	100
Manufacturing-	
Light	75
Heavy	125
Offices	50
Railroad roundhouses	250
Repair garages	100
Rest rooms	50
Shipping rooms	150
Stairways and ramps	100
Storage-	
Light	125
Heavy	250

Unit live loads of occupancy uses not specified in this Section shall be determined on the basis of occupancies of similar character.

Floors of areas where partitions are subject to be relocated shall be designed to support in addition to specified loads, a uniformly distributed load equal to twenty (20) pounds per square foot.

Floors of areas subject to superimposed loads by installa-

tion of equipment or machinery, placing, displaying, or storage of material or merchandise, or movement of heavy or loaded vehicles, shall be designed to support in all affected areas in addition to specified design loads, one and one-half ($1\frac{1}{2}$) times the concentrated superimposed load, which of vehicles, trucks or railroad equipment shall be the concentrated load of the heaviest loaded single wheel.

413.05—Mixed Occupancy Separation

Buildings of Group L Occupancy and areas or portions thereof, shall be separated from specified areas and other occupancies of the same building by an occupancy separation of not less in hours of fire-resistive construction than specified in this section and in Table No. 413-B.

Reference: Subsection 401.053.

Table No. 413-B

Mixed Occupancy Separations—Group L

Occupancy Separations—Group L														
Group Occupancy	A	B	C	D	E	F	G	-H-		I	J	K	L	M
Separation in hours	4	4	4	4	4	4	4	4	4	4	4	4	x	4

Kitchens, bakeries and service areas supplying food to dining areas, cafeterias or commissaries shall be separated from adjoining areas by not less than one-hour fire-resistive construction.

Paint spray booths shall be separated from other areas by not less than three-hours fire-resistive construction and shall be constructed as provided in this Code.

413.06—Allowable Floor Area

Buildings of Group L Occupancy shall not exceed the floor areas in square feet per story specified in this section and in Table No. 413-C.

Table No. 413-C

Allowable Floor Area—Group L

Type of Construction	I	II	III	IV	V
Fire Zone I	NP	NP	NP	NP	NP
II	9000	5400	3600	4500	NP
Outside Fire District	UL	6000	4500	5400	NP

Allowable floor areas as specified in Table No. 413-C may be increased as provided herein and in Table No. 413-D, and when applicable, increases in percentage of floor area per story as specified for limited heights, one-hour fire-resistive construction, automatic sprinkler system and excess exposure distances may be compounded; except, increases shall not be allowed for one-hour fire-resistive construction or

automatic sprinkler systems where required by other provisions of this Code.

Table No. 413-D
Allowable Increases in Floor Area—Group L

Allowable Increases	No. Stories	Percentage of Increase Type of Construction				
		I	II	III	IV	V
Limited Heights— not more than	3	40	40	40	40	NP
not more than	2	75	75	75	75	
One-hour Constr.-	x	50	50	50	50	
Sprinkler system— more than	1	200	200	200	200	
not more than	1	300	300	300	300	

Excess Exposure Distance—Reference: Subsection 401.062.

The allowable area of aircraft hangars, planing mills and woodworking establishments of not more than two (2) stories in height shall not be limited, provided, the building is equipped with an approved automatic sprinkler system and exterior walls are not less than sixty (60) feet from adjacent property lines on one hundred (100) per cent of the perimeter of the building.

413.07—Limiting Heights

Buildings of Group L Occupancy shall not exceed the limiting heights in stories or the maximum height in feet specified in this section and in Table No. 413-E.

Table No. 413-E
Limiting Heights in Stories—Group L

Types of Construction	I	II	III	IV	V
Fire Zone I	NP	NP	NP	NP	NP
II	4	2	1	1	NP
Outside Fire District	UL	2	1	1	NP
Maximum Ht. in Feet	UL	2	1	1	NP

Limiting heights as specified in Table No. 413-E may be increased as provided herein; except, increases shall not be allowed for one-hour fire-resistive construction throughout or automatic sprinkler systems where required by other provisions of this Code, or when increases in area have been allowed for such construction or equipment.

Limiting Heights may be increased by one (1) story, of fifteen (15) feet, in buildings of Types II or IV of one-hour fire-resistive construction throughout, or when equipped with an approved automatic sprinkler system.

413.08—Exterior Walls and Protection of Openings

Exterior bearing walls or portions of such walls and allowable openings therein, of buildings of Group L Occupancy located less than the specified exposure distance from adjacent property lines shall be of not less in fire-resistive construction than specified in this section and in Table No. 413-F.

Table No. 413-F
Fire-Resistance of Exterior Bearing Walls
and Protection of Openings—Group L

Type of Const.	Exposure Distance in feet	Exterior Walls					
		Construction in hours			Protection of Openings in hours		
Fire Zones—		I	II	O	I	II	O
I	Less 5				NP	NP	NP
	Less 30		4	4			
	Minimum		INC	INC		1	1
II	Less 5					NP	NP
	Minimum		4	4		1	1
III	Less 5					NP	NP
	Less 10					1	1
	Minimum		4	4			
IV	Less 5		4	4		NP	NP
	Less 10		2	2		1	1
	Minimum		1	1			

NP—Not Permitted. INC—Incombustible.

Buildings shall face upon a yard, open space, court, street or public way of such size and width to provide an exposure distance of not less than twenty (20) feet in the entire length of one (1) exterior wall, and such exposed wall shall contain the main entrance and exit of the building at grade level.

Exterior walls and openings therein of aircraft repair hangars located less than sixty (60) feet from adjacent property lines shall be of not less than one-hour fire-resistive construction.

413.09—Occupant Capacity and Exitways

The occupant capacity of buildings or structures of Group L Occupancy and areas or portions and specified occupancy uses thereof, and the required number, width and capacity of exitways and units thereof, shall be as provided in this Code and as specified in this section and subsections.

Reference: Subsection 401.09.

Section 413.091

Occupant Capacity

Exitways shall include corridors, lobbies, foyers, arcades, aisles, stairs, ramps, landings, doors, vestibules, exits or other areas serving in whole or in part as a required means of exit travel to the exterior of the building, and exitways shall terminate upon a publicway, public alley or street, or upon a yard, court or open space with direct access to a publicway, public alley or street.

413.091—Occupant Capacity

The maximum occupant capacity of buildings or structures of Group L Occupancy and areas or portions and specified occupancy uses thereof, and the capacity of exitways or corridors, stairways, doors and exits or units thereof, and the distance of travel to exit, shall not exceed the capacity and distance specified in this Code and in Table No. 413-G.

Occupant capacity shall be determined based upon specified square feet of area per occupant.

The aggregate total widths of exitways and units thereof, shall be determined based upon the specified number of occupants and tributary occupant load for each twenty-two (22) inch unit of width, and no single unit shall be less in width than the specified minimum in inches.

The number of exitways or units thereof, shall be determined based upon square feet of area served and heights as

Table No. 413-G
Maximum Occupant Capacity—Group L

Occupant Use	Occupant Capacity Sq. Ft. per Occupant	Travel to Exit (feet)	Number of Occupants per 22" Unit Width			
			Corridor	Exit Stairs	Exit Doors	Exits to exterior
Industry-Hazardous Manufacturing	100	75	40	30	40	50
Woodworking plants	150	75	40	30	40	40
Power houses	150	75	40	30	40	40
RR Roundhouses	150	150	40	30	40	40
Warehouses	300	100	40	30	40	40
Storage	300	100	40	30	40	40
Paint shops	150	75	40	30	40	40
Repair garages	150	100	40	30	40	40
Repair hangars	150	100	40	30	40	40
Dry cleaning plants	150	75	40	30	40	40

specified herein, and by distance of travel to exit, and the total required widths shall be equally divided among the required number.

Distance of travel to exit as specified in Table No. 413-G may be increased by fifty (50) per cent in buildings of one-hour fire-resistive construction throughout, and by one-third ($\frac{1}{3}$) in buildings equipped with an approved automatic sprinkler system; except, only one (1) such increase shall be allowed.

The maximum occupant capacity of rooms or areas used as places of employment shall be conspicuously posted by the owner of the building by means of durable metal signs in each such room or area and of such form as approved by the Building Official, and it shall be in violation of this Code to deface or remove such sign or permit more than the legal number of occupant within such room or area.

413.092—Exitways

Exitways and units thereof, shall be provided buildings of Group L Occupancy and areas or portions and specified occupancy uses thereof, of such capacity, widths and number as determined by the occupant capacity of the building, tributary occupant loads, areas and heights, and distance of travel to exit as provided in this Code and this section.

Exitways leading into or through service, storage or hazardous areas, or areas of distinct and separate occupancy, shall not be included in the required number of exitways.

Aisles of manufacturing or production areas used as exitways shall be not less than two hundred (200) per cent of the required widths of corridors based on tributary occupant loads and shall be open area exclusive of area occupied by machinery or equipment, or for storage or stocking of materials.

Exitways of manufacturing or production areas located on other than the ground floor, shall discharge directly to an exit stairway having direct access to a means of egress to the exterior of the building.

The required number of exitways of manufacturing or production areas shall be arranged a distance apart equal to not less than one-fifth ($\frac{1}{5}$) of the perimeter of the area.

413.093—Corridors

Corridors of buildings of Group L Occupancy shall be of such capacity and width as determined by the occupant capacity and tributary occupant loads of the building and areas or portions thereof, and shall be not less than sixty (60) inches in width.

413.094—Stairways

Stairways of buildings of Group L Occupancy shall be of

such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than required for floor area per story for each stairway as specified in Table No. 413-H.

Table No. 413-H

Required Stairways based on Area per Story—Group L

Heights in Stories	Area per Story per Stairway in Sq. Ft. Type of Construction	
	I - II	III - IV
Not more than 2	7500	6750
Not more than 3	5000	4500
Not more than 6	4500	
More than 6	4000	

Stairways shall be not less than forty-four (44) inches in width; except, stairways serving areas of the building to which the public does not have access and a tributary occupant load of less than fifty (50) may be thirty-six (36) inches in width.

Buildings of two (2) or more stories in height shall be provided with not less than two (2) stairways accessible to all areas of the building.

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types I and II construction for each additional stairway over two (2).

Areas per story as specified for each stairway may be increased by ten (10) per cent in buildings of Types III and IV construction of one-hour fire-resistive construction throughout.

Areas per story as specified for each stairway may be increased by one-third ($\frac{1}{3}$) in buildings of Types I, II, III and IV construction equipped with an approved automatic sprinkler system.

One (1) of the required stairways of buildings of three (3) or more stories in height shall be a smokeproof tower of approved design and construction.

Reference: Chapter 705.

Ramps with a slope not greater than one (1) in eight (8) may be substituted for required stairways; and such ramps shall be not less in width than the required stairway.

413.095—Doors and Doorways

Doorways of buildings of Group L Occupancy used as units of exitways shall be of such capacity and widths as

determined by the occupant capacity and tributary occupant loads of the building and areas or portions and specified occupancy uses thereof.

Doors may be used in doorways as single or multiple units as necessary to gain required widths, and no single door shall be less than thirty-six (36) inches or more than fifty-four (54) inches in width; except, doors serving non-hazardous areas to which the public does not have access and of a tributary occupant capacity of less than ten (10) may be thirty (30) inches in width.

Exits of manufacturing, or work areas located on other than the ground floor, shall open directly to an exit stairs having direct access to a means of egress to the exterior of the building or upon a corridor having direct access to such exit stairs.

Required exits of manufacturing or work areas shall be arranged a distance apart equal to not less than one-fifth ($1/5$) of the perimeter of the area.

413.096—Exits to the Exterior

Exits to the exterior of buildings of Group L Occupancy shall be of such capacity, width and number as determined by the occupant capacity, tributary occupant loads and distance of travel to exit of the building and areas or portions and specified occupancy uses thereof, and shall be not less in number than specified herein.

1000 or more occupants Four (4) exits

500 to 999 occupants....Three (3) exits

10 to 499 occupants.....Two (2) exits

Exit doorways to the exterior shall be not less than seventy-two (72) inches in clear width exclusive of door framing and doors shall swing to the full width, and exits shall be not less in width than the total required widths of exitways discharging thereto.

The total required widths of exits to the exterior from the building and areas or portions thereof, shall be equally divided among the required number and, except, as provided in this Code, exits shall be not farther apart than twice the specified distance of travel to exit.

413.10—Vertical Openings

Vertical openings in buildings of Group L Occupancy shall be enclosed as provided in this Code and this section.

Reference: Section 401.10.

Stairways leading from the ground floor to areas above or below shall be enclosed.

Shafts, vents, ducts and chutes shall be enclosed.

413.11—Light, Ventilation and Sanitation

Buildings or structures of Group L Occupancy and rooms,

areas or portions and specified occupancy uses thereof, accessible to the public or used for industrial purposes and places of employment shall have floors and ceilings of not less in area and height than specified herein and shall be provided with sanitation facilities, light and ventilation as specified in this section.

Reference: Section 401.11.

413.111—Ceiling Heights, Room Areas, Light and Ventilation

Minimum ceiling heights and floor areas of rooms and specified areas and required window area based on percentage of floor area and the percentage of window area required to open for ventilation shall be as provided in this subsection and in Table No. 413-I.

Table No. 413-I

Minimum Ceiling Heights, Room Area and Window Area Group L

Occupancy Use	Ceil- ing Height feet	Floor Area sq. ft.	Window		Venti- lating System Class
			Area %	Open- ing %	
Industry- Production areas					
Main floors	12	100	12	50	II
Upped floors	12	100	12	50	II
Auto Repair Shops	16		20	50	II
Offices	12	100	12	50	II
Toilet rooms	10		10	50	I

Artificial lighting and automatic ventilating systems may be substituted for natural light and ventilation, and ventilating system shall be required as specified in Table No. 413-I and where required or used in lieu of windows shall be of the class specified and as defined in this Code.

Reference: Subsection 401.111.

413.112—Sanitation Facilities

Buildings shall be provided with not less than one (1) toilet room on each floor for each sex and each toilet room shall contain not less than one (1) water closet and one (1) lavatory, and each building and areas or portions of specified occupancy use thereof, shall have in addition not less than one (1) toilet room for each sex equipped as determined by the occupant capacity of the building or area as provided in Table No. 413-J.

Reference: Subsection 401.113.

Table No. 413-J
Required Equipment of Toilet Rooms—Group L

Number of Occupants	No. of Lavatories	No. of Water Closets		No. of Urinals Male
		Female	Male	
Less than 25		2		1
25 to 49	1	3	1	2
50 to 99	2	5	2	3
100 or over— each 30		1		
each 60	1		1	1

413.12—Heating Equipment and Installation

Heating units or apparatus generating heat, chimneys, boiler or furnace rooms and special appliances or equipment for heating buildings of Group L Occupancy shall be installed, located or constructed as provided in this Code and this section.

Reference: Section 401.12.

413.13—Storage and Special Hazards

Areas or portions of buildings of Group L Occupancy used for storage of combustible or explosive materials or products shall be separated from production and work areas housing employees as provided in this Code.

Reference: Section 401.13.

413.14—Fire Protective Equipment

Fire protective equipment where required or installed in buildings of Group L Occupancy shall be of approved type and shall be installed as provided in this Code and this section.

Reference: Section 401.14.

Alarm systems shall be required in all usable areas above or below the ground floor and in all buildings of more than ten thousand (10,000) square feet of floor area per story.

Automatic sprinkler systems shall be required in all portions of buildings occupied in whole or in part as a planing mill, box factory or woodworking establishment where lumber is made into a finished product, and in all portions of buildings occupied in whole or in part as a mattress factory or as a furniture upholstery establishment using cotton, silk floss or mohair materials for stuffing.

Interior wet standpipes shall be required in all buildings of three (3) or more stories in height and in buildings of more than twenty thousand (20,000) square feet of floor area in any story.

413.15—Special Equipment

Special apparatus, equipment or appliances installed in buildings of Group L Occupancy and becoming an integral part or portion of the structure and affecting the occupants thereof, shall be installed, located or constructed as provided in this Code and this section and subsections.

Reference: Section 401.15.

CHAPTER 414
GROUP M
ACCESSORY OCCUPANCY

414.01—Group M Occupancy Defined

Group M Occupancy shall include buildings or structures and areas or portions thereof, of accessory use to other occupancies and shall include:

Private Garages	Carports
Private Greenhouses	Fences
Sheds	

Buildings or structures of accessory use shall be classified in the occupancy group their use most closely resembles, and except as provided in this Chapter shall be subject to the provisions of this Code for such occupancy.

Reference: Subsection 401.016.

Reference: Chapter 401—General occupancy requirements.

414.02—Type of Construction

Buildings or structures of Group M Occupancy may be of Types I, II, III, IV or V construction.

Reference: Article V.

414.03—Fire District Requirements

Buildings or structures of Group M Occupancy of Type V construction shall not be permitted in Fire Zone I.

Reference: Article III.

414.04—Design and Loading

Buildings of Group M Occupancy and areas or portions thereof of specified occupancy uses shall be designed for unit live loads of pounds per square foot of floor area as provided in this Code and this Section, and as specified in Table No. 414-A.

Reference: Chapter 601.

Table No. 414-A
Unit Live Loads—Group M

Occupancy Use	Pounds per sq. ft.
Garages—private	75
Greenhouses—private	75
Stairways	100
Storage-	
Light	150
Heavy	250

Unit live loads of occupancy uses not specified in this Section shall be determined on the basis of occupancies of similar character.

414.05—Mixed Occupancy Separation

Buildings of Group M. Occupancy and areas or portions thereof, shall be separated from specified areas and other occupancies of the same building by an occupancy separation of not less in hours of fire-resistive construction than specified in this section and in Table No. 414-B.

Reference: Subsection 401.053.

Table No. 414-B
Mixed Occupancy Separations—Group M

Group Occupancy	-H-													
	A	B	C	D	E	F	G	1	2	I	J	K	L	M
Separation in hours	1	1	1	1	2	3	2	3	2	1	4	2	4	x

414.06—Allowable Floor Area

Buildings of Group M Occupancy shall not exceed one thousand (1000) square feet in floor areas.

414.07—Limiting Heights

Buildings of Group M Occupancy shall not exceed one (1) story or fifteen (15) feet in height.

414.08—Exterior Walls and Protection of Openings

Exterior bearing walls or portions of such walls and allowable openings therein, of buildings of Group M Occupancy located less than the specified exposure distance from adjacent property lines shall be of not less in fire-resistive construction than specified in this section and in Table No. 414-F.

Buildings shall face upon a yard, open space, court, street or public way of such size and width to provide an exposure distance of not less than twenty (20) feet in the entire length of one (1) exterior wall, and such exposed exterior wall shall contain the main entrance and exit of the building at grade level.

414.09—Occupant Capacity and Exitways

The occupant capacity of buildings or structures of Group M Occupancy and areas or portions and specified occupancy uses thereof, and the required number, width and capacity of exitways and units thereof, shall be as provided in this Code and as specified in this section and subsections.

Reference: Section 401.09.

Exitways shall include corridors, lobbies, foyers, arcades, aisles, stairs, ramps, landings, doors, vestibules, exits or other areas serving in whole or in part as a required means of exit travel to the exterior of the building, and exitways shall terminate upon a publicway, public alley or street, or upon a yard, court or open space with direct access to a publicway, public alley or street.

Table No. 414-F
Fire-Resistance of Exterior Bearing Walls
and Protection of Openings—Group M

Type of Const.	Exposure Distance in feet	Exterior Walls					
		Construction in hours			Protection of Openings in hours		
Fire Zones—		I	II	O	I	II	O
I	Less 3				NP	NP	NP
	Less 30		4	4			
	Less 50	4					
	Minimum	INC	INC	INC	1	1	1
II	Less 3				NP	NP	NP
	Minimum	4	4	4	1	1	1
III	Less 3				NP	NP	NP
	Less 10					1	1
	Less 20				1		
	Minimum	4	4	4			
IV	Less 3	4	4	1	NP	NP	NP
	Less 10	2				1	1
	Less 20				1		
	Minimum	1	1				
V	Less 3		4	1		NP	NP
	Less 10					1	1
	Minimum		1				

NP—Not Permitted. INC—Incombustible.

Buildings or structures of Group M Occupancy shall have not less than one (1) exitway leading from all portions or areas of the building directly to the exterior at grade level.

Corridors or aisles used as exitways of buildings of Group M Occupancy shall be not less than thirty-six (36) inches in width.

The required width of doors used as exits in buildings of Group M Occupancy and portions or areas thereof, shall be not less than thirty-six (36) inches in width.

Doors used as exits shall swing in the direction of exit travel and be arranged as to open easily from the inside without use of a key or special knowledge.

Exit doors opening to the exterior of the building at grade level shall not swing over sidewalks or public property and shall open upon a landing not less in dimension in any direction than the swing of the door.

414.10—Vertical Openings

Openings in buildings of Group M Occupancy extending vertically shall not be permitted.

414.11—Light, Ventilation and Sanitation

Buildings or structures of Group M Occupancy and of accessory use; except, as specified herein, shall be provided with light, ventilation and sanitation facilities as provided in this Code for occupancies the use most nearly resembles.

Reference: Section 401.11.

414.12—Heating Equipment and Installation

Heating units or apparatus generating heat, chimneys, boiler or furnace rooms and special appliances or equipment for heating buildings of Group M Occupancy shall be installed, located or constructed as provided in this Code and this section.

Reference: Section 401.12.

414.13—Storage and Special Hazards

Areas or portions of buildings or structures of Group M Occupancy shall not be used for storage of combustible or explosive materials or products.

Reference: Section 401.13.

414.14—Fire Protective Equipment

Fire protective equipment where required or installed in buildings of Group M Occupancy shall be of approved type and shall be installed as provided in this Code and this section.

Reference: Section 401.14.

414.15—Special Equipment

Special apparatus, equipment or appliances installed in buildings of Group M Occupancy and becoming an integral part or portion of the structure and affecting the occupants thereof, shall be installed, located or constructed as provided in this Code and this section and subsections.

Reference: Section 401.15.

414.16—Fences

Fences of six (6) or more feet in height shall be constructed of incombustible materials or shall be subject to provisions of this Code regulating exposure distances from adjacent property lines.

Joint property fences may be constructed upon the property line between buildings of Group A Occupancy of combustible materials; except, such fences shall not exceed four (4) feet in height and shall be not less than five (5) feet from exterior walls of structures.

CHAPTER 415

GROUP N

TEMPORARY OCCUPANCY

415.01—Group N Occupancy Defined

Group N Occupancy shall include buildings, structures or enclosures and areas or portions thereof, to be used for temporary purposes of specified occupancy use and period of time, and subject to approval of the Building Official may include:

Construction Shacks

Scaffolding

Reviewing Stands

Bleachers

Circus and Carnival Structures and
amusement rides or conveyances

Tents

Speakers Platforms

Boxing Rings

Concession Stands

Structures or arenas for Athletic and Sporting Events

Reference: Subsection 401.015.

Reference: Chapter 401—General occupancy requirements.

Each separate building, structure or enclosure of temporary occupancy, and each amusement ride or conveyance to be used by the public, shall be subject to issuance of a building permit and payment of the prescribed permit and inspection fee.

Subject to inspection and approval, and subject to approval of electrical connections and installations, heating equipment, plumbing and sanitation facilities and fire protective measures by the designated authority, the Building Official may issue a temporary certificate of compliance and occupancy and shall cause all areas, equipment or conveyances used by the public to be conspicuously posted as to maximum occupant capacity.

415.02—Types of Construction

Buildings or structures of Group N Occupancy shall be of such Type of Construction as approved by the Building Official; except, such temporary construction shall not constitute a hazard to adjoining buildings or structures.

Tents used as temporary structures and by the public shall be treated with an approved fire proofing chemical or formula.

415.03—Fire District Requirements

Location of buildings or structures of Group N Occupancy shall be subject to approval of the Building Official; except, tents used as temporary structures and by the public shall not be permitted within the Fire District.

415.04—Design and Loading

Buildings or structures of Group N Occupancy and areas

or portions thereof of specified occupancy uses shall be designed for unit live loads of pounds per square foot of floor area as provided in this Code and this Section, and as specified in Table No. 415-A.

Reference: Chapter 601.

Table No. 415-A
Unit Live Loads—Group N

Occupancy Use	Pounds per sq. ft.
Arenas	100
Bleachers and reviewing stands	100
Public rooms	100
Offices	50
Rest rooms	50
Scaffolding	75
Speakers and raised platforms	100
Stairways and ramps	100
Storage-	
Light	125
Heavy	250

Unit live loads of occupancy uses not specified in this Section shall be determined on the basis of occupancies of similar character.

415.05—Mixed Occupancy Separation

Buildings or structures of Group N Occupancy and areas or portions thereof, shall be separated from other occupancies and structures as approved by the Building Official.

415.06—Allowable Floor Area

Allowable floor area of buildings or structures of Group N, Temporary Occupancy, shall be subject to approval of the Building Official; except, buildings or structures of assembly uses shall not exceed allowable floor areas provided in this Code for Assembly Occupancy.

415.07—Limiting Heights

Limiting heights of buildings or structures of Group N, Temporary Occupancy, shall be subject to approval by the Building Official.

415.08—Location on Property

Exterior walls or portions of such walls and allowable openings therein, of buildings or structures of Group N Occupancy and the exposure distances from adjacent property lines shall be as approved by the Building Official; except, as provided in this Code for occupancies of temporary nature.

Exposure distance of tents and amusement rides or con-

veyances from adjacent property lines shall be not less than double the height of such tent or conveyance and shall be not less than sixty (60) feet, and the exposure distance of each such structure from each other shall be not less than double the height of the highest such structure.

Tents and amusement rides or conveyances shall not be closer than one hundred (100) feet to gasoline service stations, or buildings or structures of other Occupancies.

415.09—Occupant Capacity and Exitways

The occupant capacity of buildings or structures and areas or portions and specified occupancy uses thereof, and the required number, width and capacity of exitways and units thereof, shall be subject to determination of the Building Official, based upon requirements of this Code for occupancies of similar character.

The occupant capacity of buildings or structures of Group N Occupancy used by the public shall not be greater than provided in this Code for assembly occupancies, or shall the required number and widths of corridors, exitways or aisles, stairs, doors and exits be less; except, the travel to exit shall be reduced by fifty (50) per cent.

Reference: Chapter 409.

Temporary seating or bleachers shall be as approved by the Building Official.

415.10—Vertical Openings

Vertical openings in buildings or structures of Group N Occupancy shall be as approved by the Building Official. .

415.11—Light, Ventilation and Sanitation

Buildings or structures of Group N Occupancy shall be provided with sanitation facilities, light and ventilation as determined by the Building Official.

Reference: Section 401.11.

415.12—Heating Equipment and Installation

Heating units or apparatus generating heat, chimneys, and special appliances or equipment for heating buildings or structures of Group N Occupancy shall be installed, located or constructed as approved by the Building Official.

415.14—Fire Protective Equipment

Fire protective equipment of buildings or structures of Group N Occupancy shall be as required by the Building Official.

415.15—Special Equipment

Special apparatus, equipment or appliances installed in buildings or structures of Group N Occupancy shall be installed, located or constructed as approved by the Building Official.



ARTICLE V

Requirements Based on Type of Construction

CHAPTER 501

CLASSIFICATION OF ALL BUILDINGS BY TYPES OF CONSTRUCTION AND GENERAL REQUIREMENTS

501.01—General

The requirements of this article are the minimum requirements for the various Types of Construction. That a building may be classed in any specific Types of Construction, it shall comply with all of the requirements for that Type of Construction, as specified in this code.

No buildings or portion thereof shall be required to conform to the details of Type of Construction higher than that type which meets the minimum requirements based on Occupancy (Article IV) or Location in Fire Zone (Article III) even though certain features of such building actually conform to a higher Type of Construction.

The various Types of Construction herein defined represent varying degrees of public safety and resistance to fire. Where specific materials, types of construction or fire-resistive protection are required, such requirements shall be the minimum requirements and any materials, types of construction or fire-resistive protection which will afford equal or greater public safety or resistance to fire, as specified in this code, may be used.

Any system or method of construction to be used shall admit of a rational analysis in accordance with well established principles of mechanics.

501.02—Classification by Types of Construction

All buildings shall be divided into the following Types of Construction based upon their resistance to fire, and Type I shall be deemed to be most fire-resistive and Type V the least fire-resistive Type of Construction.

Type I—Fire-resistive Construction.

Type II—Heavy Timber Construction.

Type III—Ordinary Masonry Construction.

Type IV—Light Incombustible Frame Construction.

Type V—Wood Frame Construction.

When two or more types of construction occur in the same building and are not separated by an unpierced wall of four-hour fire-resistive construction, the entire building shall be classed in the least fire-resistive type of construction and

such buildings shall be subject to the restrictions of such type. Any building erected prior to the passage of this code, which by its construction cannot be classified definitely as Type I, II, III, IV, V as defined herein, shall for the purpose of the provisions of this Code be deemed to belong to the least fire-resistive class of the two types to which it most nearly conforms. Any building which cannot be classed as Type I, II, III, or IV Construction shall be considered to be of Type V Construction.

501.03—Exterior Walls

Exterior Walls enclosing the floor area shall be constructed and maintained for all buildings hereafter erected whenever no openings are allowed in exterior walls and wherever any fire protection for openings in the exterior walls is required in this code.

CHAPTER 502
TYPE I BUILDINGS
FIRE-RESISTIVE

502.01—Definition

In "Type I buildings," the structural frame shall be of structural steel or iron which shall be fire-protected, or shall be of reinforced concrete. The exterior walls, inner court walls, and walls enclosing vertical openings, shall be of fire-resistive construction. The roof construction and floors shall be of fire-resistive materials. Exterior doors and windows, except as specified in Section 502.13, shall be of fire-resistive construction.

502.02—Height Allowable

The height of Type I Buildings shall not be limited.

502.03—Areal Allowable

The floor area of Type I buildings shall not be limited.

502.04—Foundations

Footings shall be of solid masonry as specified in Chapter 602 or reinforced concrete as specified in Chapter 602, and shall be designed as specified in Section 601.11 and Chapter 604. Foundation walls shall be of masonry or reinforced concrete as specified in Chapter 701.

502.05—Exterior and Inner Court Walls

Exterior walls shall be of not less than four-hour fire-resistive construction, except that walls fronting on streets having a width of at least fifty feet (50') in Fire Zone No. 1 or thirty feet (30') in Fire Zone No. 2 may be of incombustible construction with all structural members fire-protected as required in Section 502.09.

Inner court walls shall be of not less than three-hour fire-resistive construction.

502.06—Partitions

Interior partitions shall be constructed of incombustible materials and shall be of not less than one-hour fire-resistive construction.

Exceptions: Temporary partitions dividing portions of stores, offices or similar places occupied by one tenant only may be constructed of wood panels or similar light construction up to three-fourths the height of the room in which placed; when more than three-fourths the height of the room, such partitions shall have not less than the upper one-fourth of the partition constructed of plain glass set in sash.

502.07—Enclosures

Enclosures for elevator shafts, vent shafts, stair wells and other vertical openings, when required because of occupancy in Article IV shall be of not less than two-hour fire-resistive construction and all openings therein shall be protected by fire-resistive doors or windows.

Reference: Chapter 706.

A parapet wall or hand rail at least thirty inches (30") in height above the roof shall be provided around all open shaft enclosures extending through the roof.

502.08—Structural Framework

Structural framework shall be of structural steel or iron as specified in Chapter 604 or shall be of reinforced concrete as specified in Chapter 603.

The structural frame shall be considered as the columns, and all girders, beams, trusses or spandrels having rigid connection to the columns and all other members essential to the stability thereof. The members of floor or roof panels which have no connection to the columns, shall be considered secondary members. The structural frame and secondary members shall be designed and constructed to carry all dead, live and other loads to which they may be subjected both during erection and after completion of the structure. Unless otherwise provided for in the structural frame the floor and roof panel construction shall be designed and constructed to carry the horizontal forces to such parts of the structural frame as are designed to carry the horizontal forces to the foundation.

The entire structural frame and each member which is a part of such frame shall be so designed and constructed that the stresses may be satisfactorily determined by a rational analysis in accordance with well established principles of mechanics and sound engineering practice.

502.09—Fire-Protection of Structural Members

All structural steel or iron columns, beams or girders shall be protected with not less than three-hour fire-resistive protection.

Exceptions: a. The thickness of the fire-protection on the outer edge of lugs or brackets on columns may be reduced to not less than one inch (1").

b. The masonry over window openings may be supported by a steel plate, angle or similar member which is not fire-protected on the under side, provided the member is supported at proper intervals from the structural beam or girder which is fire-protected on all sides. For openings in masonry bearing walls not exceeding four feet (4') in width, an angle or similar member supported by masonry and not fire-protected on the under side may be used.

All reinforced concrete columns, beams and girders shall be protected with not less than three-hour fire-resistive protection.

502.10—Floor Construction

Floor construction shall be an incombustible floor system of not less than two-hour fire-resistive construction.

The type of floor construction used shall provide means to keep the beams and girders from spreading, by installing either ties or bridging, with no laterally unsupported length of joists being permitted to exceed eight feet (8') except as otherwise provided in Sections 703.02 and 703.03. The floor and roof panel construction shall be so designed and constructed as to transfer horizontal forces to such parts of the structural frame as are designed to carry the horizontal forces to the foundations, unless such forces are provided for otherwise.

Where wood sleepers are used for laying wood floors the space between the floor slab and the underside of the wood flooring shall be filled with incombustible material in such a manner that there will be no open spaces under the flooring which will exceed one hundred square feet (100 sq. ft.) in area and such space shall be filled solidly under all partitions so that there is no communication under the flooring between adjoining rooms.

502.11—Roof Deck Construction

Roofs shall be constructed of any materials or combination of materials as allowed for floors in Section 501.10.

Exception: Roofs more than twenty-five feet (25') above any floor, balcony or gallery, may be of unprotected incombustible materials.

Roof covering shall be a "Fire-Retardant" roofing as specified in Chapter 704.

Any drainage fill placed on a roof deck of any building shall be of incombustible material and such fill shall be considered as a part of the dead load in designing the roof framing.

502.12—Stair Construction

Stairs and stair platforms shall be constructed of reinforced concrete, iron or steel with treads and risers of concrete, iron or steel. Brick, marble, tile or other hard incombustible materials may be used for the finish of such treads and risers.

All stairs shall be designed and constructed as specified in Chapter 705 and as required under Occupancy in Article IV.

502.13—Doors and Windows

Doors, windows and other openings in the exterior walls shall be protected by one-hour fire-resistive construction.

Exceptions: a. The provisions of this Section shall not apply to doors, windows and other openings which face directly upon, and are not within fifty feet (50') in Fire Zone No. 1 or are not within thirty feet (30') in Fire Zone No. 2, of the opposite side of a public street or other public place, this distance to be measured at right angles to the plane of the wall in which such openings occur.

b. The provisions of the first paragraph of this Section shall not apply to openings in an outer court twenty feet (20') or more in width parallel to and facing upon a street or public place, provided such openings are not within twenty feet (20') of an adjacent property line.

502.14—Projections from the Building

Bays, oriels and similar projections shall be constructed of incombustible materials with walls, floors and roofs as specified in this Chapter and as specified in Chapter 708.

Porches and exterior balconies shall be constructed of incombustible materials but structural steel or iron members need not be fire-protected; provided, that loading platforms for warehouses, freight depots and similar buildings may be of heavy timber construction with wood floors not less than one and five-eighths inches (1½") thick. Such wood construction shall not be carried through the exterior walls of any Type I building.

Cornices, marquees and similar appendages which are a part of a Type I building shall be constructed of substantial incombustible materials and as required in Chapter 902.

502.15—Penthouses and Skylights

Penthouses and other roof structures shall be constructed of masonry or reinforced concrete, and all doors, windows and other openings therein shall be of not less than one-hour fire-resistive construction.

Skylights shall be constructed of not less than one-hour fire-resistive materials.

Reference: Chapter 708.

502.16—Combustible Materials Regulated

Wood or unprotected steel or iron shall be permitted in the following places:

a. Mezzanine floors may be of wood or unprotected steel provided that there shall be not more than two such mezzanines in any room of any building and provided, further, that no such mezzanine floor or floors shall cover more than 33½ per cent of the area in the room where located. Such mezzanine floors constructed in Fire Zone No. 1 shall be of heavy timber construction as required for floor construction in Type II buildings or of incombustible material protected

with lath and plaster approved for one-hour fire-resistive construction.

b. Show window frames and aprons, also show cases and other appurtenances on the first floors of stores or other similar buildings may be of wood with or without unprotected steel or iron.

c. Trim, picture molds, chair rails, wainscoting, baseboards, hand rails, show window backing, temporary partitions, floors, and sleepers may be of wood. Wood doors may be used except in stair, elevator or other shaft enclosures or where not specifically prohibited under Occupancy in Article IV.

d. Roofs may be sheathed by wood planks of two and one-half inches ($2\frac{1}{2}$ " nominal thickness when such sheathing is more than thirty feet (30') distant from any floor, balcony or gallery and when such plank sheathing is protected on the underside by a ceiling of not less than one-hour fire-resistive construction.



CHAPTER 503
TYPE II BUILDINGS
HEAVY TIMBER CONSTRUCTION

503.01—Definition

In "Type II Buildings" the structural frame shall be of structural steel or iron which shall be fire-protected, of reinforced concrete, of masonry or of heavy timbers, provided, that in buildings not exceeding one story and sixty-five feet (65') in height the structural steel or iron may have the fire-protection omitted. Exterior walls shall be of fire-resistive construction. Inner court walls shall be of incombustible materials or protected solid wood. Roof construction shall be of wood or incombustible materials. Floors and non-bearing partitions shall be of wood or incombustible materials.

503.02—Height Allowable

Type II buildings shall not exceed a height of seventy-five (75) feet; provided, that the height of a building erected on sloping ground may be not to exceed seventy-five feet (75') plus a vertical distance equal to the vertical change in slope along the length of any side of such building but in no case shall such height exceed eighty-five feet (85') above the adjacent finished ground level; provided, further, that no one-story building shall exceed a height of sixty-five feet (65').

Towers, spires and steeples erected as a part of the building and not used for habitation or storage may extend not to exceed twenty feet (20') above such height limit.

503.03—Area Allowable

The floor area of Type II buildings shall be limited according to occupancy as required in Article IV.

503.04—Foundations

Footings shall be of solid masonry as specified in Chapter 602 or of reinforced concrete as specified in Chapter 603, and shall be designed as specified in Section 601.11 and Chapter 701. Foundation walls shall be of masonry or reinforced concrete as specified in Chapter 701.

503.05—Exterior and Inner Court Walls

Exterior walls shall be of not less than four-hour fire-resistive construction, except that walls fronting on streets having a width of at least fifty feet (50') in Fire Zone No. 1 or thirty feet (30') in Fire Zone No. 2 may be of incombustible construction, with columns having not less than three-hour fire-resistive protection and beams and girders not less than two-hour fire-resistive protection.

All walls within five feet (5') of adjacent property lines (excepting property lines abutting a street or an alley) and

all walls within ten feet (10') of other buildings on the same property shall be provided with a parapet wall at least thirty inches (30") high above the roof at all points, provided that parapet walls need not be constructed on buildings twenty feet (20') or less in height or where the roof slopes more than 20 degrees from the horizontal back from the exterior wall of such building.

Inner court walls shall be the same as exterior walls or shall be of not less than four-inch solid wood laminated construction protected on the weather side thereof by incombustible fire-resistive materials.

503.06—Partitions

Interior partitions shall be of one-hour fire-resistive construction or may be of solid wood construction formed of two layers of one-inch (1") nominal matched boards or of solid wood laminated construction not less than three and five-eighths inches (3 $\frac{5}{8}$ ") thick.

Where wood partitions abut or adjoin masonry walls they shall be tied as required in Section 605.05.

Temporary partitions as specified in Section 502.06 may be used.

503.07—Enclosure of Vertical Openings

Enclosures of elevator shafts, vent shafts, stair wells and other vertical openings shall be of not less than two-hour fire-resistive construction (see Chapter 706); provided, that in buildings not more than three stories in height which are completely sprinkled as specified in Chapter 710 such enclosure walls may be of any construction permitted for interior partitions.

A parapet wall or hand rail at least thirty inches (30") in height above the roof shall be provided around all open shaft enclosures extending through the roof.

503.08—Structural

The structural frame shall be as specified in Chapter 603 for reinforced concrete, Chapter 604 for structural steel and Chapter 605 for solid wood.

All wood columns in such structural frame shall be directly superimposed, one above the other, (no girders or bolsters between columns) and shall be provided with steel or cast iron caps or pintles which shall be self-releasing wherever any horizontal members are framed into such columns. No wood column shall be less than eight inches (8") nominal in its least dimension; no beam, girder or joist shall be less than six inches (6") nominal in its least dimension, nor less than forty-eight square inches (48 sq. in.) nominal in cross-sectional area, except roof joist which shall be not less than 3"x12" or thirty-six square inches (36 sq. in.) nominal in

cross-sectional area; and no wood roof truss or arch framing member shall be less than four inches (4") nominal in least dimension, except that top and bottom chords of truss may be built up of two or more elements of not less than three inches (3") nominal thickness when the space between such elements is either solidly filled or is tightly closed for the full length on the underside thereof with a wood cover plate of two-inch (2") nominal thickness.

503.09—Fire Protection of Structural Members

All structural steel or iron members (not including frames and structural members for elevators and elevator enclosures) shall be thoroughly fire-protected. Such fire-protection shall be of three-hour fire-resistive protection for columns, and two-hour fire-resistive protection for beams, girders, and floor systems, provided, that such fire-protection may be omitted in buildings of one (1) story not exceeding sixty-five (65) feet in height.

Exceptions: a. The thickness of the fire-protection of the outer edge of lugs or brackets on columns may be reduced to not less than one inch (1").

b. The masonry over window openings may be supported by a steel plate, angle or similar member which is not fire-protected on the under side, provided the member is supported at proper intervals from a structural beam or girder which is fire-protected on all sides. For openings in masonry bearing walls not exceeding four feet (4') in width, an angle or similar member supported by masonry and not fire-protected on the under side may be used.

Wood structural members shall not be required to be fire-protected.

All reinforced concrete columns shall be thoroughly fire-protected with not less than three-hour fire-resistive protection and all joists, beams, girders and slabs shall be thoroughly fire-protected with not less than two-hour fire-resistive protection outside of all steel reinforcing.

503.10—Floor Construction

Floor construction shall be as required for Type I buildings or shall be of one of the types noted below:

a. Floor construction shall be of tongued and grooved or splined lumber not less than three inches (3") nominal thickness with a top layer of flooring of one inch (1") nominal thickness laid thereon.

b. Construction of solid lumber placed on edge and securely spiked together to make a floor not less than four inches (4") nominal thickness.

If such floor is six inches (6") nominal or more in thickness the lumber shall be air seasoned or kiln dried.

A space of one-half inch ($\frac{1}{2}$ ") shall be required between all floor construction and the wall which it adjoins to allow for swelling in case the floor becomes wet. This space shall be properly covered by a molding so arranged that it will not interfere with the swelling and shrinking movements of the flooring.

Wood joists, beams and girders supported by masonry walls shall be anchored thereto as required in Chapter 605. Ventilation shall be provided between the ground and a wood floor as required in Section 605.14.

The timbers and planking shall be self-releasing at end support on walls and no planking or timber shall extend through or across any part of occupancy separation walls.

503.11—Roof Deck Construction

Roof deck construction shall be as required for floor construction in Section 503.10, except that the minimum allowable thickness of roof sheathing shall be one and one-half inches ($1\frac{1}{2}$ ").

Roof covering shall be a "Fire-Retardant" roofing as specified in Chapter 807 and shall be required over all combustible roof construction.

503.12—Stair Construction

Stair construction may be of wood in buildings not exceeding three stories in height.

In buildings four or more stories in height all stairs and stair construction shall be as required for Type I buildings.

All stairs and exits shall be designed and constructed as specified in Chapter 705 and as required under Occupancy in Article IV.

503.13—Doors and Windows

Doors, windows and other openings in the exterior walls shall be protected by one-hour fire-resistive construction.

Exceptions: a. The provisions of this Section shall not apply to doors, windows and other openings which face directly upon, and are not within, fifty feet (50') in Fire Zone No. 1 or are not within thirty feet (30') in Fire Zone No. 2 of the opposite side of a public street or public place, this distance to be measured at right angles to the plane of the wall in which such openings occur.

b. The provisions of the first paragraph in this Section shall not apply to openings in an outer court twenty feet (20') or more in width parallel to and facing upon a street or public place, provided such openings are not within twenty feet (20') of an adjacent property line.

503.14—Projections from the Building

Bays, oriels and similar projections shall be constructed of

incombustible materials with walls, floors and roofs as specified in this Chapter and in Chapter 708.

Porches and exterior balconies shall be constructed of incombustible materials but structural steel or iron members need not be fire-protected; provided, that loading platforms for warehouses, freight depots and other similar buildings may be of heavy timber construction with wood floors not less than one and five-eighths inches ($1\frac{5}{8}$ ") thick. Such wood construction shall not be carried through the exterior walls of any Type II building.

Cornices, marquees and similar appendages which are a part of a Type II building shall be constructed of substantial incombustible materials and as specified in Chapter 902.

503.15—Penthouses and Skylights

Penthouses shall be of not less than two-hour fire-resistive construction.

Skylights shall be of not less than one-hour fire-resistive construction.

Reference: Chapter 708.

503.16—Combustible Materials Regulated

No wood lath or wood furring shall be allowed in any building of Type II construction, but unprotected steel or iron or wood will be allowed in the following places:

a. Mezzanine floors may be of wood or unprotected steel, provided that there shall be not more than two such mezzanines in any room of any building, and provided, further, that no such mezzanine floor or floors shall cover more than $33\frac{1}{3}$ per cent of the area in the room where located.

b. Show window frames and aprons, also show cases and other appurtenances on the first floors of stores and other similar buildings may be of wood, with or without unprotected steel or iron.

c. Trim, hand rails, show window backing and temporary partitions as specified in Section 502.06, picture molds, chair rails and wainscoting or baseboards may be of wood. Wood doors may be used, except in stair, elevator and other shaft enclosures, or where not specifically prohibited under Occupancy in Article IV.

CHAPTER 504
TYPE III BUILDINGS
ORDINARY MASONRY

504.01—Definition

In "Type III Buildings," the interior load bearing construction may be masonry or reinforced concrete walls or a structural frame of steel, reinforced concrete or wood. Exterior walls shall be of fire-resistive materials. Partitions, floors and roof framing may be of wood.

500.02—Height Allowable

Type III buildings shall not exceed a height of fifty-five feet (55'); provided, that the height of a building erected on sloping ground may be fifty-five feet (55') plus a vertical distance equal to the vertical change in slope along and in the length of any side of such building, but in no case shall such height exceed sixty-five feet (65') above the adjacent finished ground level; and provided, further, that towers, spires and steeples erected as a part of such building and not used for habitation or storage may extend not to exceed fifteen feet (15') above such height limit.

504.03—Area Allowable

The floor area of Type III buildings shall be limited according to Occupancy as required in Article IV.

504.04—Foundations

Footings shall be of solid masonry as specified in Chapter 602 or of reinforced concrete as specified in Chapter 603, and shall be designed as specified in Section 601.11 and Chapter 701. Foundation walls shall be of masonry or reinforced concrete as specified in Chapter 701.

504.05—Exterior and Inner Court Walls

Exterior walls shall not be less than four-hour fire-resistive construction, except that walls fronting on streets having a width of at least fifty feet (50') in Fire Zone No. 1 or thirty feet (30') in Fire Zone No. 2 may be of incombustible construction with all structural members having not less than one-hour fire-resistive protection.

All walls within five feet (5') of adjacent property lines (except property lines abutting a street or alley) and all walls within ten feet (10') of other buildings on the same property shall be provided with parapet walls at least thirty-(30) inches high above the roof at all points; provided that parapet walls need not be constructed on buildings twenty feet (20') or less in height or where the roof slopes more than 20 degrees from the horizontal back from the exterior wall of such building.

Inner court walls and all other walls not forming the ex-

terior walls of the building may be as required for Type I or Type II buildings, or shall be of not less than one-hour fire-resistive construction.

504.06—Partitions

Partitions of wood shall be constructed as required in Chapter 605. Bearing partitions, when constructed of wood, shall not support more than two stories and a roof.

Temporary partitions as specified in Section 502.06 may be used.

504.07—Enclosure of Vertical Openings

Enclosures for elevator shafts, vent shafts, stair wells and other vertical openings when required because of Occupancy in Article IV shall be of not less than one-hour fire-resistive construction.

A parapet wall or hand rail at least thirty inches (30") in height above the roof shall be provided around all open shaft enclosures extending through the roof.

504.08—Structural Framework

Structural framework shall be of steel, iron, reinforced concrete, masonry or wood and shall be designed and erected as specified in Chapter 603 for reinforced concrete, Chapter 604 for steel and iron, Chapters 505 and 602 for wood and Chapters 601 and 701 for masonry.

504.09—Fire-Protection of Structural Members

Fire-protection of steel or iron structural members may be omitted unless otherwise provided, because of location as in Article III or Occupancy as in Article IV, or as required in this Chapter.

All members carrying masonry in buildings over one story in height shall be fire-protected with not less than one-hour fire-protection. Bottom flanges of exterior lintels need not be fire-protected.

504.10—Floor Construction

Floors may be constructed as specified in Chapter 603 for reinforced concrete, Chapter 602 for masonry, Chapter 605 for wood, and Chapter 604 for steel or iron.

In all buildings having usable space under the first floor, except; Groups A and M occupancies, the underside of such floor construction when of metal or wood shall be protected by a ceiling of lath and plaster approved for one-hour fire-resistive construction.

Wood joists, beams and girders supported by masonry walls shall be anchored thereto as required in Section 605.05. Ventilation shall be provided between the ground and a wood floor as required in Section 605.14.

504.11—Roof Deck Construction

Roof deck construction shall be of Type of Construction permitted for floors except where otherwise required because of Occupancy in Article IV.

Roof covering shall be a "Fire-Retardant" roofing as specified in Chapter 807.

504.12—Stair Construction

Stairs may be of steel, iron, reinforced concrete, masonry or wood and shall be designed and constructed as specified in Chapter 705, and as required under Occupancy in Article IV.

504.13—Floors and Windows

Doors, windows and other openings in exterior walls may be of wood or of plain glass and wood sash unless otherwise required under Occupancy in Article IV or Location in Article III.

504.14—Projections from the Building

Bays, oriels and similar projections shall be constructed of incombustible materials with walls, floors and roof as required in this Chapter and in Chapter 708.

Porches and exterior balconies shall be constructed of incombustible materials but structural steel or iron members need not be fire-protected; provided, that loading platforms for warehouses, freight depots and similar buildings may be of heavy timber construction with wood floors not less than one and five-eighths inches ($1\frac{5}{8}$ ") thick. Such wood construction shall not be carried through the exterior walls of any Type III building.

Cornices, marquees and similar appendages which are a part of a Type III building shall be constructed of substantial incombustible materials and as required in Chapter 902.

503.15—Penthouses and Skylights

Penthouses and other roof structures shall be of not less than one-hour fire-resistive construction. Skylights shall be of not less than one-hour fire-resistive construction.

504.16—Combustible Materials Regulated

Wood shall be permitted in a building of Type III construction except where specifically prohibited under Occupancy in Article IV or Location in Article III.

Combustible insulating materials may be placed in the partition, floor or roof framing but shall in no way interfere with the fire blocking or fire separations required by this code.



CHAPTER 505
TYPE IV BUILDINGS
LIGHT INCOMBUSTIBLE FRAME

505.01—Definition

In "Type IV Buildings" the structural framework shall be of steel, iron, masonry or reinforced concrete and exterior walls shall be of incombustible materials. Partitions, floors and roof construction shall be of incombustible material except as specified in this Chapter.

505.02—Height Allowable

Type IV buildings shall not exceed a height of forty-five feet (45'); provided, that the height of such building erected on sloping ground may be forty-five feet (45') plus a vertical distance equal to the vertical change in slope along and in the length of any side of such building but in no case shall such height exceed fifty-five feet (55') above the adjacent finished ground level. Towers, spires and steeples erected as a part of such building and not used for habitation or storage may extend not to exceed ten feet (10') above such height limit.

505.03—Area Allowable

The floor area of a Type IV building shall be limited as specified under Occupancy in Article IV and Location in Article III.

505.04—Foundations

Footings shall be of solid masonry as specified in Chapter 602 or of reinforced concrete as specified in Chapter 603, and shall be designed as specified in Section 601.11 and Chapter 701. Foundation walls shall be of masonry or reinforced concrete as specified in Chapter 701.

505.05—Exterior Walls

Exterior wall covering shall provide suitable protection from the elements and shall be of incombustible material of such thickness, strength and so anchored to the wall frame as to resist effectively wind and other forces that may be applied to it. Wall coverings may be considered a structural part of the structural frame if designed and constructed to act integrally therewith.

Studs or other similar vertical supports shall in no case be spaced more than four feet (4') on centers. All openings wider than the regular stud spacing in the walls shall be trussed or provided with lintels with proper end support provided that where no studs are used the structural frame shall be designed in accordance with Chapter 601, Chapter 603 or Chapter 604. All walls shall be thoroughly and effectively braced and effectively fire-stopped at all floor and

ceiling levels with incombustible materials. All steel studs shall be designed in accordance with Chapter 604.

All roof and floor loads shall be transmitted to the steel studs or other supporting members, either directly or by means of a load distributing member. Maximum wall height between horizontal supports perpendicular to bearing walls shall not exceed forty-five (45) times the structural thickness of the wall.

Portland cement plaster not less than one and one-half inch ($1\frac{1}{2}$ ") in thickness reinforced in two directions with not less than three-tenths per cent of steel may be considered to act with the studs to resist bending and shear under horizontal forces when said reinforcement is anchored to the stud in such a manner as to resist effectively the stresses developed. The unit stresses for such reinforced plaster shall be not more than 50 per cent of those allowed for concrete beams based on a compressive strength of such plaster of 1500 pounds per square inch.

Reference: Chapter 603.

505.06—Partitions

Bearing partitions shall be constructed as required for exterior walls. Interior non-bearing partitions shall be of incombustible materials.

505.07—Enclosure of Vertical Openings

Enclosures for elevator shafts, stair wells and other vertical openings when required because of Occupancy in Article IV shall be of not less than one-hour incombustible fire-resistive construction.

Reference: Chapter 706.

A parapet wall or hand rail at least thirty inches (30") in height above a flat roof shall be provided around all open shaft enclosures extending through the roof.

505.08—Structural Framework

The structural framework shall be as specified in Chapter 604 for iron and steel, Chapters 602 and 701 for masonry and Chapter 603 for reinforced concrete.

505.09—Fire-Protection of Structural Members

Fire protection of structural members may be omitted unless otherwise provided, because of location as in Article III or Occupancy as in Article IV, or as required in this Chapter.

All members carrying masonry in buildings over one story in height shall be fire-protected with not less than one-hour fire-protection. Bottom flanges of exterior lintels need not be fire-protected.

505.10—Floor Construction

Floor construction shall be of incombustible material,

provided, however, that wood flooring may be used.

505.11—Roof Construction

Roof construction may be of any type of construction permitted by this code.

Roof covering shall be a "Fire Retardant" roofing as specified in Chapter 807.

505.12—Stair Construction

Stairs shall be of any type permitted by these rules and regulations and shall comply with the requirements of Chapter 705.

505.13—Doors and Windows

Doors, windows and other openings in exterior walls may be of any type permitted by this Code, unless otherwise required under Occupancy in Article IV, and Fire Zones in Article III.

505.14—Projections from Building

Porches, cornices, marquees, canopies and all other similar projections from the building shall be of incombustible materials, except that a loading platform not including the roof or roof structure thereof, may be constructed of wood as specified in Section 503.14.

505.15—Penthouses and Skylights

Penthouses and other roof structures shall be constructed as required for the main portion of the building. (See Chapter 708.) Skylights shall be constructed as required in Chapter 708.

505.16—Combustible Materials Regulated

Combustible insulating materials may be used in any part of the building but shall not be installed in such a manner as to interfere with the fire-stopping elsewhere herein required.



CHAPTER 506
TYPE V BUILDINGS
WOOD FRAME

506.01—Definition

In "Type V Buildings," enclosing walls, interior walls, partitions, floors and roofs shall be of wood as specified in Chapter 605 or of wood in combination with other materials except where prohibited as specified under Occupancy in Article IV. Any building which cannot be classed as Type I, II, III or IV construction shall be considered to be of Type V.

506.02—Height Allowable

Type V buildings shall not exceed a height of thirty-eight feet (38'); provided, that the height of a building erected on sloping ground may be thirty-eight (38) feet plus a vertical distance equal to the vertical change in slope along and in the length of any side of such building but in no case shall such height exceed forty-five feet (45') above the adjacent finished ground level; provided, further, that spires, towers or steeples erected as a part of such building and not used for habitation or storage may extend not to exceed ten feet (10') above such height limit.

506.03—Area Allowable

The maximum floor area allowable for a Type V building shall in no case exceed that specified under Occupancy in Article IV or Location in Article III.

506.04—Foundations

All exterior walls and interior bearing walls of Type V buildings shall be supported on continuous solid masonry or reinforced concrete footings which shall be of sufficient size to support safely the loads imposed as determined from the character of the soil. Masonry foundation walls shall extend at least six inches (6") above the finished grade adjacent to the wall at all points. Mudsills shall be bolted to the foundation or foundation wall with not less than one-half inch ($\frac{1}{2}$ ") bolts, embedded at least seven inches (7") into the masonry and spaced not more than six feet (6') apart.

Exceptions: a. Interior bearing walls in one-story buildings may be supported on piers.

b. For Type V buildings (except Group A and B occupancies) isolated piers of solid masonry or reinforced concrete may be used for post and girder construction.

Foundations for all buildings where the surface of the ground slopes more than one foot (1') in ten feet (10') shall be level or shall be stepped so that both top and bottom of such foundation are level.

Foundations of Type V buildings may be of piles, con-

structed as provided in Chapter 701.

506.05—Retaining Walls

Basement walls and all other walls used as retaining walls in connection with Type V buildings shall be not less than eight inches (8") in thickness. All such walls shall be designed for the loads specified in Section 601.10.

Minimum foundation requirements shall be as set forth in Table No. 506-A.

Table No. 506-A
Minimum Foundation Requirements
Type V Buildings

Number of Stories	Thickness of Foundation Wall in Inches		Width of Footing in Inches		Thickness of Footing in Inches	Depth of Foundation Below Natural Surface of Ground and Finish Grade in Inches
	Concrete	Unit Masonry				
1	6	8	Concrete	12	6	18
			Unit Masonry	14		
2	8	8	Concrete	16	8	24
			Unit Masonry	16		
3	10	12	Concrete	18	8	36
			Unit Masonry	20		

506.06—Exterior Plaster

a. **Lathing.** Studs shall be sheathed, or wire of not less than 18 W & M gauge shall be stretched taut horizontally at intervals not exceeding six inches (6") on centers vertically and securely fastened in place. The frame shall be covered with building paper as required in Section 506.19.

Plaster shall be reinforced with one of the materials having a rust-resistive coating applied after fabrication, as set forth in Table No. 506-B.

Metal reinforcements shall be furred out from the backing at least one-quarter inch ($\frac{1}{4}$ ") with an approved furring device, and shall be nailed with galvanized nails or approved furring devices driven to at least three-quarters inch ($\frac{3}{4}$ ") penetration which shall be spaced not more than six inches (6") apart vertically and sixteen inches (16") apart horizontally. Metal reinforcements shall be lapped at least one full mesh at all joints. When no sheathing is used, all vertical joints shall be made at the studs and horizontal joints where expanded metal or metal lath is used shall have at least one tie between studs, made with not less than No. 18 W & M gauge galvanized annealed tie wire.

b. **Application.** Exterior plaster shall be portland cement plaster meeting the requirements of Table No. 506-C.

Table No. 506-B
Exterior Plaster Reinforcement

Type of Reinforcement	Minimum Dimension of Openings	Maximum Dimension of Vertical Openings	Minimum W & M Gauge	Minimum Weight lbs./sq. yd.
Expanded metal				1.8
Metal lath				3.0
Woven netting	1"	1"	18	1.6
Woven netting	1"	1½"	17	1.4
Woven netting	1"	2"	16	1.4
Welded netting	1"	1"	18	1.4

Plasticity agents shall be of approved types and if added to portland cement in the manufacturing process, no later additions shall be made.

Except for pneumatically applied plaster, exterior cement plastering materials shall be mixed by machine for not less than two minutes and shall be applied in three coats as set forth in Table No. 506-B.

Table No. 506-C
Exterior Portland Cement Plaster

Coat	Maximum Volume of Sand Per Volume of Cement	Minimum Thickness	Minimum Period Moist Curing	Minimum Interval Before Application of Succeeding Coat
First or scratch	3 ½	½"	48 hrs.	7 days
Second or brown	4 ½	¾" (1st & 2nd coats)	48 hrs.	7 days
Third or finish	2**	⅛"		

*Measured from backing to crest of scored plaster.

**Approved prepared finish coats containing not less than 1/3 by weight of portland cement may be used.

The first coat shall be forced through all openings in the reinforcement so as solidly to fill all spaces. It shall then be scored horizontally with a scratcher having one-eighth inch (⅛") clipped teeth and grooves not more than one-half inch (½") deep. The second coat shall be rodded and water floated with no variation greater than one-fourth inch (¼") in any direction under a five foot (5') straightedge. The third coat shall not be a brush coat.

c. **Pneumatically Placed Plaster.** Pneumatically placed ce-

ment plaster shall be a mixture of one part portland cement to not more than five parts sand, mixed dry, conveyed by air through a pipe or flexible tube, hydrated at the nozzle at the end of the conveyor, and deposited by air pressure in its final position. Rebound material may be screened and reused as sand in an amount not greater than 25 per cent of the total sand in any batch.

Except when applied to concrete or masonry, such plaster shall be applied in not less than two coats to a minimum total thickness of seven-eighths inch ($\frac{7}{8}$ "). The first coat shall be rodded as specified for application of the second coat. The curing period and time interval shall be as set forth in Table No. 506-C.

506.07—Exterior Walls and Wall Coverings

Construction. Exterior walls of all Type V buildings having a floor area of four hundred square feet (400 sq. ft.) or more, including additions, shall be constructed with studding not less than two inches by four inches (2"x4") spaced not more than sixteen inches (16") on centers, or such walls may be constructed of not less than four inch by four inch (4"x4") posts spaced not more than five feet (5') on centers or of larger members designed as required in Chapter 606 or may be of post and beam framing with plank sheathing not less than one and one-half inches ($1\frac{1}{2}$ ") thick or may be of laminated construction not less than four inches (4") nominal in thickness with the structural assembly properly designed to support all loads.

One-story buildings having a total floor area of not more than four hundred square feet (400 sq. ft.) may have exterior walls of vertical one-inch (1") boards and battens without studs.

Buildings two stories in height shall have walls constructed as specified above. Buildings three stories in height shall have the first story studs not less than two inches by six inches (2"x6") spaced not more than sixteen inches (16") on centers.

Underpinning shall be not less in size than the studding of the story above; provided, that all underpinning exceeding four feet (4') in height shall be not less in size than the studding required for an additional story. All such underpinning shall be effectively braced.

Where studs continue through more than one story, joists shall be nailed securely to the studs and shall be supported upon a one inch by four inch (1"x4") ribbon notched into the studs and securely nailed thereto, or by other means affording equivalent strength.

plate shall be staggered not less than four feet (4').

All exterior walls and partitions shall be thoroughly and effectively braced.

Maximum allowable height of two inch by four inch (2"x4") stud framing shall be fourteen feet (14') and of two inch by six inch (2"x6") stud framing shall be twenty feet (20') unless the wall is supported laterally by adequate framing in a horizontal direction, perpendicular to the direction of the stud wall.

All walls shall be fire-stopped effectively as required in Section 605.13.

Ventilating openings under first floor joists shall be provided as required in Section 605.14.

A wood mudsill, not less than two inches (2") thick and not less in width than the wall framing supported thereon, and of the quality required in Section 505.04 shall be placed under all wood frame walls or partitions directly supported by masonry or reinforced concrete foundations.

Sheathing. Sheathing where required for exterior wall shall be applied solidly over the wall surface and shall be one or more of the following materials:

- a. Wood not less than five-eighths inch ($\frac{5}{8}$ ") thick.
- b. Approved fiber board not less than seven-sixteenths inch ($\frac{7}{16}$ ") thick.
- c. Approved gypsum sheathing not less than one-half inch ($\frac{1}{2}$ ") thick.
- d. Approved plywood not less than five-sixteenths inch ($\frac{5}{16}$ ") thick.

All Type V buildings three stories in height shall have the exterior walls covered with a solid sheathing as set forth in this Section.

Wall Coverings. a. General. Exterior walls shall be covered on the outside with the materials and in the manner specified in this Section.

b. Weatherboarding. Studs or sheathing shall be covered on the outside face with one layer of building paper as specified in Section 506.19. Weatherboarding, when in place, shall have an average thickness of not less than five-eighths inch ($\frac{5}{8}$ ") and a minimum thickness of not less than three-eighths inch ($\frac{3}{8}$ "). Such weatherboarding shall be placed over the paper and shall be securely nailed to the studding with not less than two nails to each stud in each piece of such weatherboarding. Horizontal joints in the weatherboarding shall be tongued and grooved or shiplapped joints, or such weather boarding shall be laid shingle fashion and lapped not less than nineteen thirty-seconds inch ($\frac{19}{32}$ ") and a minimum thickness of not less than three-eighths inch ($\frac{3}{8}$ ").

Bevel siding shall have a minimum thickness measured at the butt section of not less than twenty-one thirty-second inch ($21/32''$) and a tip thickness of not less than one quarter inch ($1/4''$). Siding of lesser dimensions may be used, provided the outside face of the stud is first covered with sheathing as provided in this Section.

c. **Plywood.** Where plywood is used for covering the exterior of outside walls it shall be of the exterior type not less than three eighths inch ($3/8''$) thick. If three-ply is used without sheathing, it shall be placed so that grain of the outside plies runs perpendicular to the supporting members. Joints shall be backed solid with nailing pieces not less than two inches ($2''$) wide.

d. **Shingles or Shakes.** Shingles or shakes may be used for exterior wall covering provided the frame of the structure is covered with building paper as specified in Section 505.19. The thickness of shingles or shakes between wood nailing boards shall be not less than three-eighths inch ($3/8''$).

e. **Exterior Plastering.** See Section 506.06 for Exterior Plastering.

f. **Masonry Veneer.** See Chapter 702 for Masonry Veneer.

g. **Galvanized Iron.** Galvanized iron not less than 28 gauge may be used on stud walls without sheathing. Walls shall be effectively braced and nailing strips shall be placed in such manner as to permit the metal to be nailed at vertical intervals of not more than four feet ($4'$).

506.08—Interior Partitions

Interior partitions may be of any material permitted for exterior walls in this code. If of wood, interior partitions shall be constructed, framed and fire-stopped as required for exterior walls as specified in Chapter 602, except that interior non-bearing partitions may have a single top plate, and except that where non-bearing partitions are approximately parallel and not more than four feet ($4'$) apart, two-inch by three-inch ($2'' \times 3''$) studs sixteen inches ($16''$) on centers, may be used.

506.09 Enclosure of Vertical Openings

Enclosure walls for elevator shafts, vent shafts, stair wells and similar vertical openings through a building shall be of not less than one-hour fire-resistive construction when required under Occupancy in Article IV, except that chutes and dumbwaiter shafts with a cross-sectional area of not more than nine square feet (9 sq. ft) may be lined with approved incombustible materials covered with not less than 26 U.S. gauge sheet metal with all joints in such sheet metal lock-lapped. All openings into any such vertical enclosures shall be protected by metal or metal-clad doors with either metal or metal-clad jambs, casings or frames.

506.10—Structural Framework

Structural framework may be of any type of construction permitted in this code.

506.11—Fire-Protection of Structural Members

Fire-protection of structural framework shall not be required except as provided under Occupancy in Article IV.

506.12—Floor Construction

Floors may be of any type of construction permitted in this code.

506.13—Roof and Ceiling Construction

Roof construction may be of any type of construction permitted in this code. When roof construction is of wood it shall conform to the requirements of Chapter 605.

Roof covering shall be a "Fire Retardant" roofing, except that for Groups A, B, and M occupancies, an ordinary roofing may be used as specified in Chapter 704. Wherever a composition roofing is used, the roof construction shall be solidly sheathed with wood, sheathing to be not less than twenty-five thirty-seconds inch ($25/32$ ") thick.

506.14—Stair Construction

Stair construction may be of any type permitted in this code and shall conform to the requirements of Chapter 705.

506.15—Doors and Windows

Doors and windows may be of any type permitted in this code.

506.16—Projections from Building

Any projections from the building shall conform to the requirements for exterior walls, and shall be as required in Chapter 902.

506.17—Penthouses and Skylights

Penthouses and skylights may be of any material permitted in Chapter 708 of this code.

506.18—Combustible Materials Regulated

Combustible insulating materials may be used in any part of the building but shall not be installed in such a manner as to interfere with the fire-stopping elsewhere herein required.

506.19—Weather Protection

a. **Building Paper.** Asphalt-saturated felt free from holes and breaks and weighing not less than 14 pounds per 100 square feet, or approved waterproof paper, shall be applied over studs or sheathing. Such felt or paper shall be applied in weatherboard fashion, lapped not less than two inches (2") at horizontal joints and not less than six inches (6") at

vertical joints.

Building paper may be omitted in the following cases:

1. When exterior covering is of sheet metal.
2. In back-plastered construction.
3. When there is no human occupancy.

b. **Flashing.** Exterior openings exposed to the weather shall be flashed with rust-resistive metal or other approved flashing in such a manner as to make them waterproof.

ARTICLE VI**Engineering Regulations, Quality and Design
of the Materials of Construction****CHAPTER 601****LIVE AND DEAD LOADS****601.01—Loads Defined**

of The dead load of a building shall include the weight of the walls, permanent partitions, framing, floors, roofs and all other permanent stationary construction entering into and becoming a part of a building.

The live load includes all loads except dead and lateral loads.

601.02—Loads

Buildings and all parts thereof shall be of sufficient strength to support the estimated or actual imposed dead and live loads in addition to their own proper dead load, without exceeding the stresses noted elsewhere in these rules and regulations, provided that no building or part thereof shall be designed for live loads less than those specified in the following sections. Impact shall be considered in the design of any structure where impact loads occur.

601.021—Special Loads

Provision shall be made in designing office floors for load of 2000 pounds placed upon any space two and one-half feet ($2\frac{1}{2}'$) square wherever this load upon an otherwise unloaded floor would produce stresses greater than those caused by a uniformly distributed load of 50 pounds per square foot.

In designing floors to be used for industrial or commercial purposes the actual live load caused by the use to which the building or part of the building is to be put shall be used in the design of such building or part thereof, and special provision shall be made for machine or apparatus loads when such machine or apparatus would cause a greater load than specified for such use in Section 601.04.

Floors in office buildings and in other buildings, where partition locations are subject to change, shall be designed to support, in addition to all other loads, a uniformly distributed load equal in pounds per square foot to one-twelfth of the weight of one linear foot of the partition.

Public garages and commercial or industrial buildings in which loaded trucks are placed, used or stored shall have the floor systems designed to support a concentrated rear wheel load of a loaded truck placed in any possible position.

601.03—Method of Design

Any system or method of construction to be used shall admit of a rational analysis in accordance with well established principles of mechanics.

601.04—Unit Live Loads

Unit live loads shall be the minimum live loads in pounds per square foot of floor area to be used in the design of buildings and shall be not less than specified in this Code for each occupancy and occupancy use thereof.

Reference: Article IV.

601.041—Ceilings

All ceiling joists shall be designed for not less than 10 pounds per square foot total load.

601.042—Railings

All balcony railings shall be designed to withstand a horizontal force of 20 pounds per lineal foot, applied at the top of the railing.

601.05—Roof Loads

Roofs shall be designed for a vertical live load of 30 pounds per square foot of horizontal projection applied to any and all slopes, except as hereinafter provided.

Where the rise exceeds twelve inches (12°) per foot no vertical live loads need be assumed, but the roof shall be designed for the dead load and for a wind load of 15 pounds per square foot of vertical projection.

601.06—Reduction of Live Loads

The following reductions in assumed live loads shall be permitted in designing of columns, piers, walls, foundations, trusses and girders.

No reduction of the assumed live load shall be allowed in the design of any slabs, joists or beams.

A reduction of the total live load used in the design of girders based on a certain tributary floor area shall be permitted as noted in the following schedule. This reduction shall not be carried into the columns nor shall such reduction be used in design of buildings to be used or occupied as warehouses or for storage purposes.

Reduction Allowed

5%

10%

15%

Tributary Floor Area

100 sq. ft.

200 sq. ft.

300 sq. ft. or more

For determining the total live loads carried by columns the following reductions shall be permitted, the reductions being based on the assumed live loads applied to the entire tributary floor area:

Allowable Reduction for Warehouses and Storage Buildings

Carrying the roof	0 per cent
Carrying 1 floor and roof	0 per cent
Carrying 2 floors and roof	5 per cent
Carrying 3 floors and roof	10 per cent
Carrying 4 floors and roof	15 per cent
Carrying 5 floors or more and the roof.....	20 per cent

Live Load Reductions For Manufacturing Buildings, Stores and Garages

Carrying the roof	0 per cent
Carrying 1 floor and roof	0 per cent
Carrying 2 floors and roof	10 per cent
Carrying 3 floors and roof	20 per cent
Carrying 4 or more floors and roof	30 per cent

Allowable Live Load Reductions For All Other Buildings

Carrying the roof	0 per cent
Carrying 1 floor and roof	0 per cent
Carrying 2 floors and roof	10 per cent
Carrying 3 floors and roof	20 per cent
Carrying 4 floors and roof	30 per cent
Carrying 5 floors and roof	40 per cent
Carrying 6 floors and roof	45 per cent
Carrying 7 or more floors and roof	50 per cent

601.07—Wind Pressure

For purposes of design the wind pressure upon all vertical plane surfaces of all buildings and structures shall be taken at not less than 15 pounds per square foot for those portions of the building less than sixty feet (60') above ground and at not less than 20 pounds per square foot for those portions more than sixty feet (60') above ground.

The wind pressure upon sprinkler tanks, sky signs, or other similar exposed structures and their supports shall be taken at not less than 30 pounds per square foot of the gross area of the plane surface, acting in any direction. In calculating the wind pressure on circular tanks, towers or stacks this pressure shall be assumed to act on six-tenths (6/10) of the projected area.

The overturning moment calculated from the wind pressure shall in no case exceed two-thirds ($\frac{2}{3}$) of the dead load resisting moment.

The weight of earth superimposed over footings may be used to calculate the dead load resisting moment.

For combined stresses due to wind and other loads the allowable unit stresses may be increased 33 $\frac{1}{3}$ per cent in excess of the values given in this Article.

For members carrying wind stresses only the allowable stresses may be increased $33\frac{1}{3}$ per cent. In no case shall the section be less than required if the wind stress is neglected.

601.08—Live Loads Posted

The live loads for which each floor or part thereof of a commercial or industrial building is or has been designed shall have such designed live loads conspicuously posted on the owner in that part of each story in which they apply using durable metal signs, and it shall be unlawful to remove or deface such notices. The occupant of the building shall be responsible for keeping the actual load below the allowable limits.

601.081—Seating Capacity Posted

The maximum seating capacity shall be conspicuously posted by the owner of the building by means of durable metal signs placed in each assembly room, auditorium or room used for a similar purpose where fixed seats are not installed, and it shall be unlawful to remove or deface such notice or to permit more than this legal number of persons within such space.

601.09—Occupancy Permits for Changed Floor Loading

Plans for other than residential buildings filed with the Building Official with applications for permits shall show on each drawing the live loads per square foot of area covered for which the building is designed, and occupancy permits for buildings hereafter erected shall not be issued until the floor load signs, required by Section 601.08 have been installed. No changes in the occupancy of a building now existing or hereafter erected shall be made until a revised occupancy permit has been issued by the Building Official certifying that the floors are suitable for the loads characteristic of the proposed occupancy.

601.10—Retaining Walls and Basement Floors

When earth or water, or earth and water, cause or may cause a pressure on any building or structure, such total pressure created shall be calculated in accordance with the best accepted engineering practice, and such calculations and design shall take into account any possible surcharge due to moving or fixed loads.

601.11—Footing Design

The base area of the footings of all buildings shall be designed in the following manner: The area of the footing which has the largest percentage of live load to total load shall be determined by dividing the total load by the allowable soil load. From the area thus obtained the dead load soil pressure of such footing is determined and the areas of

all other footings of the building shall be determined on the basis of their respective dead loads only and such dead load soil pressure. In no case shall the load per square foot under any portion of any footing, due to the combined dead, live wind and/or any other loads, exceed the safe sustaining power of the soil upon which the footing rests. The total reduced live load occurring in the column immediately above the footing shall be the live load used in the above computation.



CHAPTER 602

MASONRY

602.01—General

All masonry construction shall conform to the provisions of this Chapter and in all cases shall be of sufficient thickness to keep the stresses in the masonry within the working stressed prescribed.

Tests of masonry materials may be required at reasonable intervals to determine whether they conform to these requirements. Such tests shall be made in accordance with the standards prescribed for each material.

Masonry units may be reused when clean, whole and conforming to the other requirements of this Chapter.

The minimum wall thickness and other minimum of maximum dimensions may vary as nominal dimensions. The actual masonry dimensions may vary from the nominal dimensions by not more than one-half inch ($\frac{1}{2}$ ").

602.02—Materials

Brick

All brick of clay, shale, sand-lime, or concrete shall be of a quality at least equal to that required by A.S.T.M. Specifications C62-50 for clay or shale brick, C73-51 for sand-lime brick, or C55-52 for concrete brick. When exposed to the ground or weather, the brick shall be of at least Grade MW for clay, shale or sand-lime brick; or Grade A for concrete brick.

Solid Clay or Shale Units

Solid masonry units of clay or shale shall meet the requirements for physical properties of clay or shale brick as specified in this Section.

Concrete Units

All concrete units shall be of a quality at least equal to that required by A.S.T.M. "Specifications for Hollow Load-Bearing Concrete Masonry Units" (C90-52) or "Specifications for Solid Load-Bearing Concrete Masonry Units" (C145-40) when used for bearing walls or piers, or when exposed to the ground or weather; or equal to "Specification for Hollow Non-Load-Bearing Concrete Masonry Units" (C129-52) when used for non-bearing purposes and not exposed to the weather.

Structural Clay Tile

All structural clay tile shall be of a quality at least equal to that required by A.S.T.M. "Specifications for Structural Clay Load-Bearing Wall Tile" (C34-52) Grade LB when used for bearing walls or piers, or Grade LBX when exposed to the weather or soil; or equal to "Specifications for Structural

Clay Non-Load-Bearing Tile" (C56-52) when used for interior non-load-bearing purposes; or equal to "Specification for Structural Clay Floor Tile" (C57-52) when used for floor construction.

Cast Stone

All cast stone shall be of a quality at least equal to that required by "Specifications for Cast Stone" (P3-A-29T) of the American Concrete Institute.

Plain Concrete

Cast-in-place concrete construction reinforced only for shrinkage or temperature changes shall be classed as plain concrete. Plain concrete, other than fill, shall conform to the requirements for reinforced concrete and have a minimum ultimate compressive strength at 28 days of 2,000 pounds per square inch.

Stone

All natural stone shall be sound and free from loose or friable inclusions, with sufficient strength and durability for the proposed use.

Architectural Terra Cotta

All architectural terra cotta shall have a strong homogeneous body and give a sharp, metallic, bell-like ring when struck. All units shall have the necessary anchor holes and shall be so formed as to properly engage with the supporting structure.

Glazed Building Units

All glazed building units shall be of a quality at least equal to that required by A.S.T.M. "Specifications for Glazed Building Units" (C126-50T), except that the requirements for finish shall not apply to salt-glazed building units.

Gypsum Units

All gypsum partition tile or block shall be of a quality at least equal to that required by A.S.T.M. "Specifications for Gypsum Partition Tile or Block" (C52-41).

Structural Glass Block

All structural glass block shall be precoated with a material to improve adhesion on all mortar bearing surfaces.

Cementitious Materials

Cementitious materials used in mortars shall be of a quality at least equal to the quality of materials required by the following applicable specifications:

"Quicklime for Structural Purposes," A.S.T.M. C5-26

"Hydrated Lime, Normal Finishing," A.S.T.M. C6-49

"Hydraulic Hydrated Lime for Structural Purposes," A.S.T.M. C141-42

"Natural Cement," A.S.T.M. C10-49T

"Masonry Cement," A.S.T.M. C150-52

"Gypsum," A.S.T.M. C22-50

Aggregate

Aggregate for mortar shall be of a quality at least equal to that required by A.S.T.M. "Specifications for Aggregate for Masonry Mortar" (C144-52T).

Water

Water used in mixing mortar shall be clean, and free from deleterious amounts of acids, alkalies, or organic materials.

Mortar Properties and Workability

Mortar as delivered to the mason shall have a flow after suction for one minute of not less than 65 per cent of that immediately before suction when determined by the method of the Water Retention Test of the Federal Specification for Masonry Cement, SS-C-181b.

The volume of aggregate in mortar shall be at least two times but not more than three times the volume of cementitious material.

Type of Mortar

Mortar used in masonry construction shall be classified as follows:

Type	Minimum compressive strength of 2-in. cubes at 28 days, lb. per sq. in
A	2,500
B	600
C	200
D	75

Unless the strength classification of the mortar has been established by tests in accordance with this section, mortars using the following cementitious materials may be assumed to meet the strength classification shown when mixed with aggregate in the proportions required by this Section.

Type A—1 part portland cement and not more than $\frac{1}{4}$ part hydrated lime or lime putty.

Type B—1 part portland cement and not more than $1\frac{1}{4}$ parts hydrated lime or lime putty, or masonry cement, Type II.

Type C—1 part portland cement and not more than 2 $\frac{1}{2}$ parts hydrated lime or lime putty; or masonry cement, Type I.

Type D—1 part hydrated lime or lime putty and not more than $\frac{1}{2}$ part portland cement.

When it is desired to establish the classification of a mortar by test, the test cubes shall be molded, cured and tested for compressive strength as described in the Federal "Specifications for Masonry Cement" (SS-C-181b), except for straight lime mortars the entire curing shall be in a laboratory air at 70°F. \pm 5 deg.

Types of Mortar Required

Masonry shall be laid in Type A, Type B, or Type C mortar, except as follows:

Type A mortar shall be used in nominal ten inch (10") cavity walls, foundation walls of hollow masonry units, and masonry linings of existing masonry walls.

Type A or Type B mortar shall be used in footings, foundation walls of solid masonry units, isolated piers, load-bearing or exterior walls of hollow masonry units, hollow walls of masonry, parapet walls, and cavity walls exceeding nominal ten inch (10") thickness.

Type D mortar may be used in solid masonry walls, other than parapet walls or rubble stone walls, not in contact with the soil and not less than twelve inches (12") thick nor more than thirty-five feet (35') in height, provided the walls are laterally supported at intervals not exceeding twelve times the wall thickness.

Gypsum partition tile and block shall be laid in gypsum mortar, composed of one part gypsum to not more than three parts sand by weight. Non-bearing partitions and fireproofing of structural clay tile may be laid in gypsum mortar. Fire brick shall be laid in fire clay or air-setting mortar.

Table No. 602-A
Allowable Bearing Stresses in Masonry

Unit	Working stress, lb. per sq. in., gross area Type of mortar			
	A	D	C	D
Brick and Solid Units of Clay or Shale				
4,500 lb. per sq. in.....	250	200	150	100
2,500 lb. per sq. in.....	175	140	110	75
1,500 lb. per sq. in.....	125	100	75	50
Concrete Units				
Solid				
Type A	175	125	80
Type B	125	100	60
Hollow	85	70
Structural clay tile	85	70
Rubble stone	140	100	80
Stone ashlar	400	320	250	160
Cast stone	400	320	250	160
Cavity walls				
Solid units	125	100
Hollow units	60	50
Plain concrete—0.25 times the ultimate strength				

Glass block when laid in mortar shall be laid in Type B mortar.

602.03—Working Stresses

Unless otherwise determined, the working stresses in masonry meeting the minimum requirements of this code shall not exceed those given in Table No. 602-A.

In walls or other structural members composed of different kinds or grades of units or mortar, the maximum stress shall not exceed the allowable stress for the weakest of the units and mortar of which the member is composed.

602.04—Bearing Walls

The minimum thickness of bearing walls of masonry shall be twelve (12) inches for the uppermost thirty-five (35) feet of their height and shall be increased four (4) inches in thickness for each successive thirty-five (35) feet or fraction thereof measured downward from the top of the wall; except that the top-story wall of a building not exceeding three stories or thirty-five (35) feet in height may be eight (8) inches thick provided that it is less than twelve (12) feet high and the roof beams are horizontal; except that walls of residential buildings not exceeding three stories or thirty-five (35) feet in height may be eight (8) inches thick; and except that walls of one-story single-family dwellings and private garages may be six (6) inches thick when not greater in height than nine (9) feet, with an allowance of an additional six (6) feet for gables.

Cavity Walls

Cavity walls and hollow walls of masonry units shall not exceed thirty-five (35) feet in height and Ten (10) inch cavity walls shall not exceed twenty-five (25) feet in height. In cavity walls neither the facing nor the backing shall be less than four (4) inches in thickness and the cavity shall not be less than two (2) inches nor more than three (3) inches in width.

Concrete Walls

Plain concrete walls may be two (2) inches less in thickness than required by Subsection 601.041 but not less than eight (8) inches except where six (6) inch walls are specifically permitted.

Rubble Walls

Rubble walls may be four (4) inches thicker than required for other masonry walls of the same height but in no case less sixteen (16) inches.

Non-Bearing Walls

Non-bearing walls may be four (4) inches less in thickness than required for bearing walls but shall be not less than eight (8) inches thick except where six (6) inch walls are specifically permitted.

Wire mesh reinforcement may be used to resist tensile stresses when embedded in plaster applied to the surface of any non-bearing wall. Wire mesh reinforcement shall be as specified in Chapter 603 and plaster shall be as specified in Chapter 714.

Roof Structures

Masonry walls above the roof level inclosing stairways, elevator shafts, penthouses or bulkheads may be eight (8) inches thick when twelve (12) feet or less in height, and shall not be considered as increasing the height or thickness of the wall below.

602.05—Lateral Support

The height of a masonry wall or bearing partition between successive floors or other substantial lateral supports shall not exceed twenty times its thickness for solid masonry, eighteen times its thickness for hollow masonry and hollow walls of masonry, nor fourteen times its thickness for cavity walls unless it is reinforced by adequate cross walls, piers or buttresses at these intervals.

602.06—Non-Bearing Partitions

All non-bearing partitions of masonry shall be built solidly against floor and ceiling construction below and above, and shall not exceed the unsupported heights given in Table No. 602-B.

Table No. 602-B
Minimum Thicknesses of Non-Bearing Partitions

Thickness exclusive of plaster, in.	Maximum unsupported height, ft.
2	9*
3	12
4	15
6	20
8	25

* Not over 6 ft. in length.

602.07—Foundation Walls

Foundation walls shall be not less in thickness than the walls immediately above them and in no case less than twelve (12) inches for unit masonry walls, or eight (8) inches for cast-in-place concrete walls or solid masonry walls reinforced with at least one and three-eighths (1 $\frac{3}{8}$) inch deformed bar continuous from footing to top of foundation wall for each two (2) feet of length of wall; except that solid masonry walls extending not more than five (5) feet, and hollow walls of masonry or walls of hollow units extending not more than four (4) feet below the adjacent finished

ground level may be eight (8) inches in nominal thickness. These depths may be increased to a maximum of seven (7) feet with the approval of the building official when he is satisfied that soil conditions warrant such an increase. The total height of eight (8) inch foundation wall and wall supported shall not exceed thirty-five (35) feet.

Foundation walls of eight (8) inch nominal thickness and conforming to the provisions of this Section may be used as foundations for single-family dwellings with walls of brick veneer on frame walls or with nominal ten (10) inch cavity walls, provided that the dwelling is not more than one and one-half stories in height and the total height of the wall, including the gable, is not more than twenty (20) feet. Foundation walls of eight (8) inch nominal thickness supporting brick veneer or cavity walls, shall be corbelled with solid units to provide a bearing the full thickness of the wall above. The total projection shall not exceed two (2) inches with individual corbels projecting not more than one-third the height of the unit. The top corbel course shall not be higher than the bottom of floor joists and shall be a full header course.

Foundation walls of cast-in-place concrete when supporting one-story basementless structures may be six (6) inches thick if the total height of the foundation wall and the wall supported is within the allowable height of six (6) inch walls.

602.08—Footings

All foundation walls, piers and columns shall rest on footings having a horizontal area at the bottom such that the safe carrying capacity of the soil shall not be exceeded. The thickness of the footing shall be not less than two times its projection from the face of the wall. The bottom of all footings shall extend below frost level except for one-story accessory structures not over 1,000 sq. ft. in area.

602.09—Fire Walls

Fire walls shall have a minimum fire-resistive rating of four hours in addition to conforming to the other provisions of this Chapter.

602.10—Party Walls

Party walls shall conform to the requirements for interior walls provided that when exposed to the weather they shall meet the requirements for exterior walls or be covered with an approved weather-resistant material.

602.11—Parapet Walls

Parapet walls shall be provided on all fire walls, party walls, and exterior walls of masonry or reinforced concrete where such walls connect with roofs of combustible construction making an angle of less than 20 degrees with the horizontal except that a parapet shall not be required on walls

facing a street fifty (50) feet or more in width, or fifty (50) feet or more distant for all property lines and other buildings on the same property, nor on the walls of a one- or two-family dwelling.

Parapet walls shall be not less than eight (8) inches thick, nor shall the height be more than four times the thickness unless properly reinforced. They shall extend at least twelve (12) inches above the roof for residential buildings not more than three stories high and at least thirty (30) inches above the roof for other buildings. They shall be properly coped with incombustible, weather-proof material.

602.12—Brick

There shall be a header course in all brick walls at least every seventh course on both sides of the wall or there shall be at least one full-length header in every one and one-half ($1\frac{1}{2}$) square feet of wall surface and distance between adjacent full length headers shall not exceed twenty (20) inches either vertically or horizontally.

Hollow or Solid Units

When two or more hollow units or solid units exceeding brick size are used to make up the thickness of a wall, the inner and outer courses shall be bonded at vertical intervals not exceeding thirty-four (34) inches by lapping at least four (4) inches or by lapping with units at least 50 per cent greater in width than the units below at vertical intervals not exceeding seventeen (17) inches. Hollow masonry units shall have full mortar coverage of the face shells in both the horizontal and vertical joints.

Facing

Brick facing shall be bonded to walls of solid or hollow masonry units as required by this Section.

Ashlar facing of either natural or cast stone shall have at least 20 per cent of the superficial area extending not less than four (4) inches into the backing to form bond stone, which shall be uniformly distributed throughout the wall. Every projecting stone, and except when alternate courses are full bonded courses, every stone not a bond stone shall be securely anchored to the backing with substantial non-corrodible metal anchors with a cross section of not less than two-tenths (0.2) square inches. There shall be at least one anchor to each stone and not less than two anchors for each stone more than two (2) feet in length and three (3) square feet in superficial area. Facing stones not over twelve (12) square feet in area shall have at least one anchor to each four (4) square feet of superficial face area. Facing shall be counted as part of the required wall thickness.

Veneer

Veneered walls shall have the veneer tied into the backing either by a header for every three hundred (300) square

inches of wall surface and extending at least four (4) inches into the backing, or by substantial non-corrodible metal wall ties spaced not farther apart than sixteen (16) inches vertically and two (2) feet horizontally. The veneer shall not be counted as part of the required thickness of bearing walls and shall not exceed thirty-five (35) feet in height above approved supports.

Cavity Walls

Cavity walls shall have a three-sixteenths ($3/16$) inch non-corrodible steel rod or metal tie of equivalent stiffness placed in the horizontal joints for each three (3) square feet of wall surface. Additional bonding ties shall be placed around the perimeter of all openings and shall be spaced not more than three (3) feet apart and within one (1) foot of the opening.

602.13—Change in Thickness

Except for permissible chases and recesses, walls shall not vary in thickness between their lateral supports. When a change in thickness due to minimum thickness requirements occurs between floor levels the greater thickness shall be carried to the higher floor level. Where walls of hollow masonry units are decreased in thickness, a course of solid masonry shall be interposed between the wall section below such point and that next above.

Chases

Chases in masonry walls shall not be deeper than one-third the wall thickness nor longer than four (4) feet horizontally and shall have at least eight (8) inches of masonry in back of the chases and between chases and jambs of openings, provided that in dwellings not over two stories high, chases not over four (4) inches deep, thirty (30) inches wide and twenty-four (24) inches high, may be built in eight (8) inch walls and provided that chases below windows may equal the width of the opening above. The back and sides of such chases in exterior walls shall be waterproofed and insulated.

Supported Members

When unprotected steel or combustible structural members frame into walls of thickness not greater than twelve (12) inches, they shall project not more than four (4) inches into the wall and shall be so spaced that the distance between embedded ends is not less than four (4) inches. The space above, below and between such members shall be filled solidly with burst-clay materials, mortar, concrete, or equivalent fire-resistive material to a depth of not less than four (4) inches on all sides of the members.

Beams, joists, girders or other concentrated loads supported by a wall or pier shall have bearing at least three (3) inches in length upon solid masonry not less than four (4) inches thick or upon a metal bearing plate of adequate

design and dimensions to distribute safely the loads on the wall or pier.

Support

No masonry shall be supported on combustible construction.

Corbeling

No wall of less than twelve (12) inch nominal thickness shall be used to support a corbeled chimney. Such corbeling shall not project more than six (6) inches from the face of the wall, and in all such cases the corbeling shall consist of at least five (5) courses of brick. No chimney shall be corbeled from a hollow wall or wall of hollow units.

Anchorage

Masonry walls that meet or intersect shall be adequately bonded or anchored. Floors and roofs shall be securely anchored to masonry walls at intervals not exceeding six (6) feet. The ends of all wooded beams or joists entering masonry walls shall be cut to a bevel of at least three (3) inches in the depth.

Piers

The height of isolated piers shall not exceed ten times their least lateral dimension.

Openings

The masonry above openings shall be supported by well-buttressed arches or lintels of metal or masonry, plain or reinforced, which shall bear on the wall at each end for not less than four (4) inches. Timber centering for arches may remain in place provided the opening is not over four (4) feet wide and the timber at each end bears on the wall for a distance not exceeding two (2) inches.

Freezing

All masonry shall be protected against freezing for at least 24 hours after laying. No masonry shall be built upon frozen material.

Wetting

Brick or clay shale laid in other than Type D mortar shall be wetter when laid unless their gain in weight is less than three-fourths ($\frac{3}{4}$) ounce when immersed flatwise in one-eighth ($\frac{1}{8}$) inch of water for one minute.

Erection

Except when carried independently by girders at each floor, no wall shall be built up more than twenty-five (25) feet in height in advance of other walls of the building. Walls shall be adequately braced during erection.

602.14—Grouted Masonry

Grouted masonry shall conform to all the requirements of

Sections 602.01 to 602.13 inclusive, except as modified by this Section.

Mortar and Grout

Only Types A or B mortars shall be used. Grout shall be Types A or B mortars with the addition of sufficient water to give the required consistency.

Bond

In grouted masonry with all interior joints filled with grout, headers need not be used.

Construction

All units in the two outer tiers shall be laid with full bed and head joints. All interior joints shall be filled with grout. One face tier may be carried up three courses before grouting, but the other face tier shall be carried up not more than one course above the grouting. All longitudinal vertical joints shall be not less than three-fourths inch ($\frac{3}{4}$ ") in thickness. Horizontal construction joints shall be formed by stopping the grout one and one-half inches ($1\frac{1}{2}$ ") below the top of the face tiers.

602.15—Reinforced Solid Masonry

Reinforced solid masonry shall conform to the requirements for grouted masonry except as modified by this Section.

Design

The design shall be based on the assumptions, limitations, and methods of stress determination specified for reinforced concrete in Chapter 603. The design stresses shall not exceed those given in Chapter 603 or in Table No. 602-C.

Table No. 602-C
Allowable Stresses In Reinforced Solid Masonry

Type of Stress	Allowable Unit Stresses lb. per sq. in.
Compression (Extreme fiber stress in bending) ..	500
Direct Compression on Piers	400
Shear (no web reinforcement)	30
Shear (with web reinforcement, taking entire shear)	60
Bond: Deformed bars, Vertical bars	60
Horizontal bars	80
Modulus of Elasticity E	1,500,000
Modulus of Rigidity G (Modulus of Elasticity in shear)	600,000

Mortar and Grout

Only Type A mortar and grout shall be used.

Reinforcement

The width or thickness of any space containing reinforcement shall be at least one-half ($\frac{1}{2}$) inch greater than the size of any bar or than the sum of sizes of bars which cross, except that one-fourth ($\frac{1}{4}$) inch bars may be used in one-half ($\frac{1}{2}$) inch bed joints.

In reinforced masonry walls, the minimum area of reinforcement in each direction shall be not less than 0.001 times the cross-sectional area of the wall except that when considered as ordinary or grouted masonry lesser amounts may be used to resist tensile stresses.

Vertical reinforcement which supports horizontal reinforcement shall be not less than three-eighths ($\frac{3}{8}$) inch in diameter.

If the wall is constructed of more than 2 tiers, the reinforcement shall be equally divided into two layers.

602.16—Reinforced Gypsum Cement

Gypsum shall conform to the requirements of the A.S.T.M. "Specifications for Gypsum" (C22-50):

Gypsum concrete shall consist of a mixture of gypsum and water, with or without wood chips, shavings, or fiber or other approved aggregate. The gypsum and wood chips, shavings, or fiber shall be pre-mixed at the mill, requiring the addition of water only at the job.

Precast gypsum concrete shall contain not more than 3 per cent, and cast-in-place gypsum concrete not more than 12½ per cent of wood chips, shavings, or fiber measured as a percentage by weight of the dry mix.

Wood chips, shavings, or fiber shall be dry, soft wood, uniform and clean in appearance. They shall pass a one (1) inch screen and shall not be more than one-sixteenth ($1/16$) inch in thickness.

Reinforcements shall conform to the requirements of Chapter 603.

Classification

Gypsum concrete shall be classified according to mixture, and concrete of each class shall develop a minimum strength in compression, as follows:

Class 1 Neat (containing gypsum and water only)	1,800 lb. per sq. in.
Class 2 Containing not more than 3 per cent by weight of wood chips, shavings, or fiber	1,000 lb. per sq. in.
Class 3 Containing not more than 12½ per cent by weight of wood chips, shavings, or fiber	500 lb. per sq. in.

Determination of Strength

The strength of gypsum concrete shall be determined by

compressive tests of five cylinders, six (6) inches in diameter and twelve (12) inches in length, from each twenty-five (25) tons or fraction thereof. Test specimens shall be retained not less than 24 hours in the molds in moist air until thoroughly hardened. The specimens shall then be removed from the molds and dried at a temperature of not less than 70°F. nor more than 100°F. in an atmosphere having a relative humidity of not more than 50 per cent. The specimens shall be weighed at 1-day intervals until the weight has become constant to within 0.1 per cent, and then tested. The method of testing and application of load shall conform to the requirements of Sections 19 and 20 of the Standard Method of Test for Compressive Strength of Concrete (A.S.T.M. C39-49). The average of the five specimens shall not fall below the specified minimum and in no case shall any specimen show a strength of less than 80 per cent of the specified minimum.

Allowable Stresses

The stresses in reinforced gypsum concrete shall not exceed:

Compressive stress in bending	0.25fg
Axial compressive or bearing stress	0.20fg
Bond stress (reinforcement anchored)*	0.02fg
Shearing stress (reinforcement anchored)*	0.02fg

* Hooked rods or welded wire mats.

where (fg) indicates the compressive strength of the gypsum concrete as specified in this Section.

The stressed in tension in reinforcing steel shall not exceed:

Intermediate grade

Billet-steel	(fg) = 20,000 lb. per sq. in.
Rail steel	(fg) = 20,000 lb. per sq. in.
Wires or wire mesh	(fg) = 20,000 lb. per sq. in.
Rolled shapes	(fg) = 18,000 lb. per sq. in.

The modulus of elasticity of gypsum concrete shall be considered as:

Class 1	1,000,000 lb. per sq. in.
Class 2	600,000 lb. per sq. in.
Class 3	200,000 lb. per sq. in.

Design

Except as hereinafter provided, methods of design admitting of rational analysis according to established principles of mechanics shall be used. The general assumptions and principles established for reinforced concrete shall also apply to reinforced gypsum concrete.

For precast floor and roof slabs which cannot be analyzed in accordance with established principles of mechanics, the safe load, uniformly distributed, shall be taken as one-fifth

of the total load causing failure in a full-size test panel with the load applied along two lines each distant one-fourth of the clear span from the support.

Gypsum concrete shall not be used where exposed directly to the weather or where subject to frequent or continuous wetting.

The minimum thickness of gypsum concrete in floors and roofs shall be two (2) inches except in the suspension system, which shall be not less than three (3) inches. Hollow precast gypsum concrete units for roof construction shall be not less than three (3) inches thick and the shell not less than one-half ($\frac{1}{2}$) inch thick.

Precast gypsum concrete units for floor and roof construction shall be reinforced and, unless the shape or marking of the unit is such as to insure its being placed right side up, the reinforcement shall be placed symmetrically so that the unit can support its load either side up.

In floor or roof slabs of the suspension type, the reinforcement shall consist of wires with continuity through multiple spans and anchored at ends. The wires shall be supported in the top of the slab by the roof or floor beams and shall be tightly drawn down as near to the bottom of the slab at midspan as fire protection requirements will allow, but not closer than one-half inch. Provisions shall be made in the framing of the end bays of this system for resisting the forces due to end anchorage of the wires. The wires shall be designed for a tension in pounds per foot width of slab equal to:

$$\frac{wl_g}{8d}$$

in which: w is the total load in lb. per sq. ft.

l is the clear span in feet.

d is the sag in the wires in feet.

Inspection

A competent inspector satisfactory to the building official shall be present on the work at all times when cast-in-place gypsum concrete is being mixed or deposited.

602.17—Bolts

Bolts which are embedded in masonry shall be grouted in place and the connection shall be so designed that the shear on every bolt is not more than the values given in Table No. 602-D.

Table No. 602-D
Allowable Shear On Bolts

Diameter—inches	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$\frac{1}{4}$
Embedment—inches	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$	3	4
Shear—pounds	520	820	1180	1600	2100	2600	3280

CHAPTER 603
CONCRETE
MATERIALS, MIX AND DESIGN

603.01—General

These regulations cover the use of reinforced concrete and plain concrete in any structure to be erected under the provisions of this code.

The design of all reinforced concrete structures, including all of their component parts, shall be in accordance with the requirements as set forth in Building Code for Reinforced Concrete, serial designation ACI 318-51, as published by the American Concrete Institute.

603.02—Permits and Drawings

Drawings and typical details of all reinforced concrete construction showing the size and position of all structural members, metal reinforcement, design strength of concrete, and the live load used in the design shall be filed with the Building Department as a permanent record before a permit to construct such work will be issued. All plans submitted for approval or use on the work shall clearly show the strength of concrete at a specified age for which all parts of the structure were designed. Calculations pertaining to the design shall be filed with the drawings when required by the Building Official.

603.03—Tests

a. The Building Official, or his authorized representative, shall have the right to order the test of any material entering into concrete or reinforced concrete when there is reasonable doubt as to its suitability for the purpose; to order reasonable tests of the concrete from time to time to determine whether the materials and methods in use are such as to produce concrete of the necessary quality; and to order the test under load of any portion of a completed structure, when the conditions have been such as to leave reasonable doubt as to the adequacy of the structure to serve the purpose for which it is intended.

b. Tests of materials and of concrete shall be made in accordance with the requirements of the American Society for Testing Materials as noted elsewhere in this chapter. The complete records of such tests shall be available for inspection by the Building Official at all times during the progress of the work, and shall be preserved by the engineer or architect for two years after the completion of the structure.

603.04—Load Tests

When a load test is required, the member or portion of the structure under consideration shall be subject to a super-

imposed load equal to one and one-half times the live load plus one-half of the dead load. This load shall be left in position for a period of twenty-four hours before removal. If, during the test, or upon removal of the load, the member or portion of the structure shows evident failure, such changes or modifications as are necessary to make the structure adequate for the rated capacity shall be made; or, where lawful, a lower rating shall be established. The structure shall be considered to have passed the test if the maximum deflection at the end of the twenty-four hour period does not exceed the value of D as given in the following:

$$D = \frac{.001 L^2}{12 t} \dots\dots\dots (1)$$

all terms expressed in the same units, in which

D=Deflection of a floor member under load test.

L=Span of member under load test.

t=The total thickness or depth of a member under load test.

If the deflection exceeds the value of D as given in formula (1), the construction shall be considered to have passed the test if within twenty-four hours after the removal of the load the member or portion of the structure shows a recovery of at least seventy-five per cent of the observed deflection.

603.05—Supervision

All concrete work shall be supervised by the architect or engineer responsible for its design, or by a competent representative responsible to the architect or engineer. A record shall be kept of such supervision, which record shall cover the quality and quantity of concrete materials, the mixing and placing of the concrete, and the placing of the reinforcing steel. A complete record shall also be kept of the progress of the work and of the temperatures, when these fall below 40 degrees F., and of the protection given to the concrete while curing. This record shall be available for inspection by the Building Official at all times during the progress of the work and shall be preserved by the architect or engineer for two years after the completion of the work.

603.06—Portland Cement

Portland cement shall conform to the "Standard Specifications for Portland Cement" (A.S.T.M. Serial Designation: C150-49.

603.07—Slag Cement

All slag cement that is used for making mortar or in a blend with Portland for concrete shall pass Manufacturers' Tentative Specifications for Slag Cement dated March 6, 1939, revised September 29, 1948.

603.08—Concrete Aggregate

a. Concrete aggregates shall conform to the "Standard

Specifications for Concrete Aggregates" (A.S.T.M. Serial Designation: C33-49, provided however, that aggregates which have been shown by test or actual service to produce concrete of the required strength, durability, water-tightness, fire-resistance, and wearing qualities may be used under Section 603.13 Method 2, where authorized by the Building Official.

b. The maximum size of the aggregate shall be not larger than one-fifth of the narrowest dimension between sides of the forms of the member for which the concrete is to be used nor larger than three-fourths of the minimum clear spacing between reinforcing bars.

603.09—Water

Water used in mixing concrete shall be clean, and free from injurious amounts of oils, acids, alkalis, organic materials, or other deleterious substances.

603.10—Metal Reinforcement

a. Metal reinforcement shall conform to the requirements of the "Standard Specifications for Billet-Steel Bars for Concrete Reinforcement" (A.S.T.M. Serial Designation: A-15-50T), or for "Rail-Steel Bars for Concrete Reinforcement" (A.S.T.M. Serial Designation: A-16-50T), or for "Axle-Steel Bars for Concrete Reinforcement" (A.S.T.M. Serial Designation: A160-50T).

Deformations on deformed bars shall conform to "Tentative Specifications for Minimum Requirements for the Deformations of Deformed Steel Bars for Concrete Reinforcement" (A.S.T.M. serial designation: A305-50T)."

b. Cold-drawn wire or welded wire fabric for concrete reinforcement shall conform to the requirements of the "Standard Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement" (A.S.T.M. Serial Designation: A82-34), or "Standard Specifications for Welded Steel Wire Fabric for Concrete Reinforcement" (A.S.T.M. Serial Designation: A185-37).

c. Structural steel shall conform to the requirements of the "Standard Specifications for Structural Steel for Bridges and Buildings" (A.S.T.M. Serial Designation: (A7-49T).

d. Cast-iron sections for composite columns shall conform to the "Standard Specifications for Cast Iron Pit-cast Pipe for Water and Other Liquids" (A.S.T.M. Serial Designation: A44-41).

603.11—Storage of Materials

Cement and aggregates shall be stored in such a manner as to prevent deterioration or intrusion of foreign matter. Any material which has deteriorated or which has been damaged shall not be used for concrete.

603.12—Concrete Quality

All plans, submitted for approval or used on the job, shall clearly show the assumed strength of concrete at a specified age for which all parts of the structure were designed.

603.13—Determination of Strength-Quality of Materials

The determination of the proportions of cement and water to attain the required strengths shall be made by one of the following methods:

Method 1—Concrete made from average materials:

When no preliminary tests of the materials to be used are made, the water-content per sack of cement shall not exceed the values in Table No. 603-A. Method 2 shall be employed when artificial aggregates or admixtures are used.

Table 603-A
Assumed Strength of Concrete Mixtures

Water-Content U.S. Gallons Per 94-lb. Sack of Cement	Assumed Compressive Strength at 28 Days—p.s.i.
5	3750
6	3000
6¾	2500
7½	2000

Note—In interpreting this table, surface water carried by the aggregate must be included as part of the mixing water in computing the water content.

Method 2—Controlled Concrete:

Water-content other than shown in Table No. 603-A may be used provided that the strength-quality of the concrete proposed for use in the structure shall be established by tests which shall be made in advance of the beginning of operations, using the consistencies suitable for the work and in accordance with the "Standard Method of Making Compression Tests of Concrete" (A.S.T.M. Serial Designation: C39-49). A curve representing the relation between the water-content and the average 28-day compressive strength or earlier strength at which the concrete is to receive its full working load, shall be established for a range of values including all the compressive strengths called for on the plans.

The curve shall be established by at least three points, each point representing average values from at least four test specimens. The maximum allowable water-content for the concrete for the structure shall be as determined from this curve and shall correspond to a strength which is fifteen per cent greater than that called for on the plans. No substitutions shall be made in the materials used on the work without additional tests in accordance herewith to show that the quality of the concrete is satisfactory.

603.14—Concrete Proportions and Consistency

a. The proportions of aggregate to cement for any concrete shall be such as to produce a mixture which will work readily into the corners and angles of the forms and around reinforcement with the method of placing employed on the work, but without permitting the materials to segregate or excess free water to collect on the surface. The combined aggregates shall be of such composition of sizes that when separated on the No. 4 standard sieve, the weight passing the sieve (fine aggregate) shall not be less than thirty per cent nor greater than fifty per cent of the total, except that these proportions do not necessarily apply to light-weight aggregates.

b. The methods of measuring concrete materials shall be such that the proportions can be accurately controlled and easily checked at any time during the work.* Measurement of materials for ready mixed concrete shall conform to the "Standard Specifications for Ready-Mixed Concrete" (A.S.T.M. Serial Designation: C94-48).

* Whenever practicable such measurement shall be by weight rather than by volume.

c. When controlled concrete is used and the quality and strength have been determined by test as outlined by Method 2, Section 603.13, the proportions of materials shall be determined at time of test, and a record of the tests and proposed proportions shall be filed with the Building Official for his approval.

603.15—Allowable Unit Stresses in Concrete

The unit stresses in pounds per square inch on concrete to be used in the design shall not exceed the value of Table 305 (a) as set forth in the Building Code Requirements for Reinforced Concrete, serial designation ACI 318-51, as published by the American Concrete Institute.

Allowable Unit Stresses in Reinforcement

Unless otherwise provided in these Regulations, steel for concrete reinforcement shall not be stressed in excess of the following limits:

(a) Tension

(f_s = Tensile unit stress in longitudinal reinforcement)
and (f_v = Tensile unit stress in web reinforcement)

20,000 p.s.i. for Rail-Steel Concrete Reinforcement Bars, Billet-Steel Concrete Reinforcement Bars (of intermediate and hard grades), Axle-Steel Concrete Reinforcement Bars (of intermediate and hard grades), and Cold-Drawn Steel Wire for Concrete Reinforcement.

18,000 p.s.i. for Billet-Steel Concrete Reinforcement Bars (of structural grade), and Axle Steel Concrete Reinforcement Bars (of structural grade).

(b) Tension in One-Way Slabs of Not More Than 12 Feet Span

(fs=Tensile unit stress in main reinforcement).

For the main reinforcement $\frac{3}{8}$ inch or less in diameter, in one-way slabs, 50 per cent of the minimum yield point specified in the Standard Specifications of the American Society for Testing Materials for the particular kind and grade of reinforcement used, but in no case to exceed 30,000 p.s.i.

(c) Compression, Vertical Column Reinforcement

(fs=Nominal working stress in vertical column reinforcement).

Forty per cent of the minimum yield point specified in the Standard Specifications of the American Society for Testing Materials for the particular kind and grade of reinforcement used, but in no case to exceed 30,000 p.s.i.

(fr=Allowable unit stress in the metal core of composite and combination columns):

Structural steel sections	16,000 p.s.i
cast iron sections	10,000 p.s.i
Steel pipe	See (ACI 138-51).

603.16—Tests on Concrete

a. The Building Official may require a reasonable number of compression tests to be made during the progress of the work. Such tests shall be made in accordance with the "Standard Method of Making and Storing Compression Test Specimens of Concrete in the Field" (A.S.T.M. Serial Designation C31-49), and cured in accordance with the requirements for laboratory control tests.

b. Not less than three specimens shall be made for each test; nor less than one test for each 250 cu. yd. of concrete.

c. The standard age of test shall be 28 days, but 7-day tests may be used provided that the relation between the 7- and 28-day strengths of the concrete is established by test for the materials and proportions used.

d. Where the average strength of the laboratory control cylinders for any portion of the structure falls below the minimum ultimate compressive strengths called for on the plans, the Building Official shall have the right to order a change in the mixture or in the water-content for the remaining portion of the structure. In cases where the average strength of the cylinders cured on the job falls below the required strength, the Building Official shall have the right to require conditions of temperature and moisture necessary to secure the required strength. If the average strength of either the laboratory control cylinders or the cylinders cured on the job falls below the required strength, load tests as specified in Section 603.04 may be required on the portion of the structure so affected.

603.17—Preparation of Equipment and Place of Deposit

a. Before placing concrete, all equipment for mixing and transporting the concrete shall be cleaned, all debris and ice shall be removed from the spaces to be occupied by the concrete, forms shall be thoroughly wetted (except in freezing weather) or oiled, and masonry filler units that will be in contact with concrete shall be well drenched (except in freezing weather), and the reinforcement shall be thoroughly cleaned of ice or other coatings.

b. Water shall be removed from place of deposit before concrete is placed unless otherwise permitted by the Building Official.

603.18—Mixing of Concrete

a. Unless otherwise authorized by the Building Official, the mixing of concrete shall be done in a batch mixer of approved type.

b. The concrete shall be mixed until there is a uniform distribution of the materials and shall be discharged completely before the mixer is recharged.

c. For job mixed concrete, the mixer shall be rotated at a speed recommended by the manufacturers and mixing shall be continued for at least one minute after all materials are in the mixer. A longer mixing period may be required for mixers larger than one cubic yard capacity.

d. Ready-mixed concrete shall be mixed and delivered in accordance with the requirements set forth in the "Standard Specifications for Ready-Mixed Concrete" (A.S.T.M. Serial Designation C94-48).

603.19—Conveying

a. Concrete shall be conveyed from the mixer to the place of final deposit by methods which will prevent the separation or loss of the materials.

b. Equipment for chuting, pumping and pneumatically conveying concrete shall be of such size and design as to insure a practically continuous flow of concrete at the delivery end without separation of the materials.

603.20—Depositing

a. Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. The concreting shall be carried on at such a rate that the concrete is at all times plastic and flows readily into the space between the bars. No concrete that has partially hardened or been contaminated by foreign materials shall be deposited on the work, nor shall retempered concrete be used.

b. When concreting is once started, it shall be carried on as a continuous operation until the placing of the panel or

section is completed. The top surface shall be generally level. When construction joints are necessary, they shall be made in accordance with Section 603.30.

c. All concrete shall be thoroughly compacted by suitable means during the operation of placing, and shall be thoroughly worked around the reinforcement and embedded fixtures and into the corners of the forms. Vibrators may be used to aid in the placement of the concrete provided they are used under experienced supervision, and the forms are designed to withstand their action.

d. Where conditions make compacting difficult, or where the reinforcement is congested, batches of mortar containing the same proportions of cement to sand as used in the concrete, shall first be deposited in the forms to a depth of at least one inch.

603.21—Curing

In all concrete structures, concrete made with normal portland cement shall be maintained in a moist condition for at least the first seven days after placing and high-early-strength concrete shall be so maintained for at least the first three days.

603.22—Cold Weather Requirements

a. Adequate equipment shall be provided for heating the concrete materials and protecting the concrete during freezing or near-freezing weather. No frozen materials or materials containing ice shall be used.

b. All concrete materials and all reinforcement, forms, fillers and ground with which the concrete is to come in contact, shall be free from frost. Whenever the temperature of the surrounding air is below 40 degrees Fahrenheit, all concrete when placed in the forms shall have a temperature of between 60 and 90 degrees Fahrenheit and shall be maintained at a temperature of not less than 50 degrees Fahrenheit for at least 72 hours for normal concrete or 24 hours for high-early-strength concrete, or for as much more time as is necessary to insure proper rate of curing of the concrete. The housing, covering or other protection used in connection with curing shall remain in place and intact at least twenty-four hours after the artificial heating is discontinued. No dependence shall be placed on salt or other chemicals for the prevention of freezing. Manure, when used for protection, shall not be allowed to come into contact with the concrete.

603.23—Design of Forms

Forms shall conform to the shape, lines, and dimensions of the members as called for on the plans, and shall be substantial and sufficiently tight to prevent leakage of mortar. They shall be properly braced or tied together so as to maintain position and shape.

603.24—Removal of Forms

Forms shall be removed in such manner as to insure the complete safety of the structure. Where the structure as a whole is supported on shores, the removable floor forms, beam and girder sides, column and similar vertical forms may be removed after twenty-four hours, providing the concrete is sufficiently hard not to be injured thereby. In no case shall the supporting forms or shoring be removed until the members have acquired sufficient strength to support safely their weight and the loads thereon. The results of suitable control tests may be used as evidence that the concrete has attained sufficient strength.

603.25—Pipes or Conduits Embedded in Concrete

Pipes which will contain liquid, gas or vapor at other than room temperature shall not be embedded in concrete necessary for structure stability or fire protection. Drain pipes and pipes whose contents will be under pressure greater than atmospheric pressure by more than one pound per square inch shall not be embedded in structural concrete except in passing through from one side to the other of a floor, wall or beam. Electric conduits and other pipes whose embedment is allowed shall not, with their fittings, displace that concrete of a column on which stress is calculated or which is required for fire protection to greater extent than four per cent of the area of the cross section. Sleeves or other pipes passing through floors, walls or beams shall not be of such size or in such location as unduly to impair the strength of the construction; such sleeves or pipes may be considered as replacing structurally the displaced concrete, provided they are not exposed to rusting or other deterioration, are of uncoated iron or steel not thinner than standard wrought-iron pipe, have a nominal inside diameter not over two inches, and are spaced not less than three diameters on centers. Embedded pipes or conduits other than those merely passing through, shall not be larger in outside diameter than one-third the thickness of the slab, wall or beam in which they are embedded; shall not be spaced closer than three diameters on centers, nor so located as unduly to impair the strength of the construction. Circular uncoated or galvanized electric conduit of iron or steel may be considered as replacing the displaced concrete.

603.26—Cleaning and Bending Reinforcement

Metal reinforcement, at the time concrete is placed, shall be free from rust scale or other coatings that will destroy or reduce the bond. Bends for stirrups and ties shall be made around a pin having a diameter not less than two times the minimum thickness of the bar. Bends for other bars shall be made around a pin having a diameter not less than six times the minimum thickness of the bar, except that for bars

larger than one inch, the pin shall be not less than eight times the minimum thickness of the bar. All bars shall be bent cold.

603.27—Placing Reinforcement

"a. Metal reinforcement shall be accurately placed and adequately secured in position by concrete or metal chairs or spacers. The minimum clear distance between parallel bars, except in columns, shall be equal to the nominal diameter of the bars. In no case shall the clear distance between bars be less than 1 in., nor less than one and one-third times the maximum size of the coarse aggregate. Where reinforcement in beams or girders is placed in two or more layers, the clear distance between layers shall not be less than 1 in., and the bars in the upper layers shall be placed directly above those in the bottom layer."

b. When wire or other reinforcement, not exceeding one-fourth inch in diameter is used as reinforcement for slabs not exceeding ten feet in span, the reinforcement may be curved from a point near the top of the slab over the support to a point near the bottom of the slab at mid-span; provided such reinforcement is either continuous over, or securely anchored to the support.

603.28—Splices and Offsets in Reinforcements

a. In slabs, beams and girders, splices of reinforcement at points of maximum stress shall generally be avoided. Splices shall provide sufficient lap to transfer the stress between bars by bond and shear. In such splices the minimum spacing of bars shall be as specified in Section 603.27.

b. Where changes in the cross section of a column occur, the longitudinal bars shall be offset in the region where lateral support is afforded and where offset the slope of the inclined portion shall not be more than 1 in 6, and in the case of tied columns the ties shall be spaced not over three inches on centers for a distance of one foot below the actual point of offset.

603.29—Concrete Protection for Reinforcement

a. The reinforcement of footings and other principal structural members in which the concrete is deposited against the ground shall have not less than three inches of concrete between it and the ground contact surface. If concrete surfaces after removal of the forms are to be exposed to the weather or be in contact with the ground, the reinforcement shall be protected with not less than two inches of concrete for bars more than $\frac{5}{8}$ inch in diameter and one and one-half inches for bars $\frac{5}{8}$ inch or less in diameter.

b. The concrete protective covering for reinforcement at surfaces not exposed directly to the ground or weather shall be not less than three-fourths inch for slabs and walls; and not less than one and one-half inches for beams, girders and

columns. In concrete joist floors in which the clear distance between joists is not more than thirty inches, the protection of metal reinforcement shall be at least three-fourths inch.

c. If this code specifies (Chapter 800), as fire-protective covering of the reinforcement, thickness of concrete greater than those given in this section, then such greater thickness shall be used.

d. Concrete protection for reinforcement shall in all cases be at least equal to the diameter of round bars, and one and one-half times the side dimension of square bars.

e. Exposed reinforcement bars intended for bonding with future extensions shall be protected from corrosion by concrete or other adequate covering.

603.30—Construction Joints

a. Joints not indicated on the plans shall be so made and located as to least impair the strength of the structure. Where a joint is to be made, the surface of the concrete shall be thoroughly cleaned and all laitance removed. In addition to the foregoing, vertical joints shall be thoroughly wetted but not saturated, and slushed with a coat of neat cement grout immediately before placing of new concrete.

b. At least two hours must elapse after depositing concrete in the columns or walls before depositing in beams, girders, or slabs supported thereon. Beams, girders, brackets, column capitals, and haunches shall be considered as part of the floor system and shall be placed monolithically therewith.

c. Construction joints in floors shall be located near the middle of the spans of slabs, beams, or girders, unless a beam intersects a girder at this point, in which case the joints in the girders shall be offset a distance equal to twice the width of the beam. In this last case provision shall be made for shear by use of inclined reinforcement.



CHAPTER 604

STRUCTURAL STEEL

RIVETED, BOLTED OR WELDED CONSTRUCTION

604.01 —General

The requirements of this chapter shall govern the design, fabrication, and erection of structural steel for buildings and other structures except that the requirements do not apply to steel joists, members formed of flat-rolled sheet or strip, light-gauge steel construction, skylights, marquees (except structural frame), fire escapes, or other miscellaneous light steel construction.

Except as otherwise specifically provided in this code or in rules duly promulgated by the Building Official, the Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings June 1949 edition of the American Institute of Steel Construction shall be accepted as good practice in structural steel construction.

Details of welding technique, inspection of welding, and qualifications of welding operators shall conform to the recommendations of the Code for Arc and Gas Welding in Building Construction (Jan. 1946) of the American Welding Society.

604.02 —Materials

a. Structural steel shall conform to the Standard Specifications of the American Society for Testing Materials for Structural Steel for Bridges and Buildings, Serial Designation A7-50-T.

b. Rivet steel shall conform to the Standard Specifications of the American Society for Testing Materials for Structural Rivet Steel, Serial Designation A141-50-T.

604.021—Filler Metal

All arc-welding electrodes shall conform to the requirements of the American Welding Society Specifications for Iron and Steel Arc-Welding Electrodes, (1946 edition). Electrodes shall be of classification Numbers E6010, E6011, E6012, E6013, E6020 or E6030 and shall be suitable for the positions and other conditions of intended use.

With each container of electrodes the manufacturer shall furnish instructions giving recommended voltage and amperage (and polarity if direct current) for all uses and welding positions for which the electrode is suitable.

604.022—Stock Material

a. Stock material shall be of a quality equal to that required by Section 604.02. Mill test reports shall constitute sufficient record as to the quality of material carried in stock.

b. Unidentified stock material, if free from surface imperfections, may be used for short sections of minor importance, or for small unimportant details, where the physical properties of the material would not affect the safety of the structure.

604.03 —Allowable Unit Stresses

Except as provided herein under "Bending," all parts of structure shall be so proportioned that the unit stresses in pounds per square inch shall not exceed the following values:

Structural Steel, Rivets, Bolts and Weld Metal

a. TENSION

Structural Steel, net section	20,000
Butt welds, section through throat	20,000
Rivets, on area based on nominal diameter	20,000
Bolts and other threaded parts, on nominal area at root of thread	20,000

b. COMPRESSION

Columns, gross section	
For axially loaded columns with values of l/r not greater than 120	17,000-0.485 l^2
For axially loaded columns with values of l/r greater than 120	18,000 l^2
	$1 + \frac{18,000}{l^2}$

in which l is the unbraced length of the column, and r is the corresponding radius of gyration of the section, both in inches.

Plate Girder Stiffeners, gross section	20,000
Webs of Rolled Sections at toe of fillet (crippling)	24,000
Butt-Welds, section through throat (crushing)	20,000

c. BENDING

Tension on extreme fibers or rolled sections, plate girders, and built-up members, (See Section 604.08)	20,000
Compression on extreme fibers of rolled sections, plate girders, and built-up members,	

With $\frac{ld}{bt}$ not in excess of 600	20,000
With $\frac{ld}{bt}$ in excess of 600	12,000 $\frac{ld}{bt}$

in which l is the unsupported length and d the depth, of the member; b is the width, and t the thickness, of its compression flange; all in

inches; except that l shall be taken as twice the length of the compression flange of a cantilever beam not fully stayed as its outer end against translation or rotation.

Exception:

Fully continuous beams and girders may be proportioned for negative moments which are maximum at interior points of support, at a unit bending stress 20 per cent higher than above stated; provided that the section modulus used over supports shall not be less than that required for the maximum positive moments in the same beam or girder, and provided that the compression flange shall be regarded as unsupported from the support to the point of contraflexure.

Stress on extreme fibers of pins30,000

Fiber stresses in butt welds, due to bending, shall not exceed the values prescribed for tension in compression, respectively.

For columns proportioned for combined axial and bending stresses, the maximum unit bending stress F_b , Sect. 1503.4 may be taken at 24,000 pounds per square inch, when this stress is induced by the gravity (vertical) loading of full or partially restrained beams framing into the columns.

d. SHEARING

Rivets15,000
 Pins, and turned bolts in reamed or drilled holes....15,000
 Unfinished bolts10,000
 Webs of beams and plate girders, gross section....13,000
 Weld Metal

on section through throat of fillet weld, or on
 faying surface area of plug or slot weld13,600
 on section through throat of butt weld13,000

(Stress in a fillet weld shall be considered as shear on the throat, for any direction of applied stress. Neither plug nor slot welds shall be assigned any values in resistance to stresses other than shear.)

e. BEARING

	Double Shear	Single Shear
Rivets	40,000	32,000
Turned bolts in reamed or drilled holes	40,000	32,000
Unfinished bolts	25,000	20,000
Pins		32,000

Contact Area

Milled Stiffeners and Other Milled Surfaces.....	30,000
Fitted Stiffeners	27,000
Expansion rollers and rockers (pounds per linear inch)	600d
in which d is diameter of roller or rocker in inches.	

Cast Steel

Compression and Bearing, same unit stresses as specified for Structural Steel. Other Unit Stresses, 75 per cent of those specified for Structural Steel.

Combined Axial and Bending Stresses

Members subject to both axial and bending stresses shall be so proportioned that the quantity

$\frac{f_a + f_b}{F_a + F_b}$ shall not exceed unity, in which

$F_a + F_b$

F_a =axial unit stress that would be permitted by this Specification if axial stress only existed.

F_b =bending unit stress that would be permitted by this Specification if bending stress only existed.

f_a =axial unit stress (actual)=axial stress divided by area of members.

f_b =bending unit stress (actual)=bending moment divided by section modulus of member.

Wind Only

Members subject only to stresses produced by wind forces may be proportioned for unit stresses $33\frac{1}{3}$ per cent greater than those specified for dead and live load stresses. A corresponding increase may be applied to the allowable unit stresses in their connecting rivets, bolts or welds.

Wind and Other Forces

Members subject to stresses produced by a combination of wind and other loads may be proportioned for unit stresses $33\frac{1}{3}$ per cent greater than those specified for dead and live load stresses, provided the section thus required is not less than that required for the combination of dead load, live load, and impact (if any). A corresponding increase may be applied to the allowable unit stresses in their connecting rivets, bolts or welds.

604.04 —Slenderness Ratio

a. The ratio of unbraced length to least radius of gyration, l/r , for compression members and for tension members other than rods shall not exceed:

For main compression members.....	120
For bracing and other secondary members in compression	200

For main tension members240
 For bracing and other secondary members in tension..300

b. The slenderness of a main compression member may exceed 120, but not 200; provided that it is not ordinarily subject to shock or vibratory loads and provided that its unit stress under full design loading shall not exceed the following fraction of that stipulated in Section 604.01, for its actual ratio l/r :

$$\left(\frac{1.6 - 1}{200r} \right)$$

604.05 —Minimum Thickness of Material

The following stipulations (1) and (2) as to minimum thickness shall apply to exterior steelwork enclosed in a non-impervious envelope or exposed to frequent rain or snow, and to interior steel-work subject to atmospheric exposure more corrosive than indoor atmosphere controlled for human comfort.

- (1) Columns, studs, lintels, girders and beams; exterior trusses, exterior bracing members; one-fourth inch minimum.
- (2) Purlins, girts, trusses and bracing members sheltered from direct exposure to rain and snow; three-sixteenths inch minimum.

The controlling thickness of rolled shapes, for the purposes of stipulations (1) and (2), shall be taken as the mean thickness of their flanges, regardless of web thickness.

Steelwork exposed to industrial fumes or vapor shall be given special protection as required in the judgment of the Engineer.

604.06 —Connections

The connections at ends of tension or compression members in trusses shall develop the strength required by the total stresses; but in no case shall such strength developed be less than 50 per cent of the effective strength of the material connected.

604.061—Milled Joints in Compression Members

Where compression members are in full-milled bearing on base plates, and where full-milled tier-building columns are spliced, there shall be sufficient rivets, bolts or welds to hold all parts securely in place.

Where other compression members are spliced by full-milled bearing, the splice material and its riveting or welding shall be arranged to hold all parts in line and shall be proportioned for 50 per cent of the computed stress.

All the foregoing joints shall be proportioned to resist any tension that would be developed by specified wind forces

acting in conjunction with 75 per cent of the calculated dead load stress and no live load, if this condition will produce more tension than with full dead load and live load applied.

604.062—Rivets and Bolts in Combination With Welds

In new work, rivets or bolts in combination with welds shall not be considered as sharing the stress, and welds shall be provided to carry the entire stress for which the connection is designed.

In making welded alterations to structures, existing rivets may be utilized for carrying stresses resulting from existing dead loads, and the welding need be adequate only to carry all additional stress.

604.063—Turned Bolts

Turned bolts in close-fitting holes as specified in Section 604.091 may be used in shop or field work where it is impracticable to drive satisfactory rivets. The finished shank shall be long enough to provide full bearing, and washers shall be used under the nuts to give full grip when the nuts are turned tight.

The term "turned bolt" embraces all bolts regardless of the manufacturing process, which have a tolerance on the nominal diameter of 0 over, .006 inch under, and which have regular semi-finished heads conforming to American Standard B18-2 of the American Institute of Bolt, Nut and Rivet Manufacturers.

604.064—High Tensile Steel Bolts

High Tensile Steel Bolts may be used in lieu of rivets of the same nominal diameter provided the connections are designed and constructed in accordance with the Specifications for Assembly of Structural Joints Using High Tensile Steel Bolts, Approved by Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation January, 1951.

604.07 —Composite Beams

The term "composite beam" shall apply to any rolled or fabricated steel floor beam entirely encased in a poured concrete haunch at least four inches wider, at its narrowest point, than flange of the beam, supporting a concrete slab on each side without openings adjacent to the beam; provided that the top of the beam is not less than two and one-half ($2\frac{1}{2}$) inches below the top of the slab and at least 2 inches above the bottom of the slab; provided that a good grade of stone or gravel concrete with Portland cement, is used; and provided that the concrete haunch has adequate mesh, or other reinforcing steel, throughout its whole depth and across its soffit.

604.071—Design Assumptions

Composite beams may be figured on the assumption that:

a. The steel beam carries, unassisted, all dead loads prior to the hardening of the concrete, with due regard for any temporary support provided, and

b. The steel and concrete carry by joint action all loads, dead and live, applied after the hardening of the concrete.

604.072—Unit Stresses

The total tensile unit stress in the extreme fiber of the steel beam thus computed shall not exceed 20,000 pounds per square inch. Section 604.031.

The maximum stresses in the concrete and the ratio of Young's moduli, for steel and concrete, shall be as prescribed by the specifications governing the design of reinforced concrete for the structure.

604.073—End Shear

The web and the end connections of the steel beam shall be designed to carry the total dead and live load, except as this may be reduced by the provision of other proper support.

604.08 —Plate Girders and Rolled Beams

Riveted and welded plate girders, cover-plated beams, and rolled beams shall in general be proportioned by the moment of inertia of the gross section. No deduction shall be made for standard shop or field-rivet holes in either flange; except that in special cases where the reduction of the area of either flange by such rivet holes exceeds 15 per cent of the gross flange area, the excess shall be deducted. If such members contain other holes, as for bolts, pins, countersunk rivets, or plug or slot welds, the full deduction for such holes shall be made. The deductions thus applicable to either flange shall be made also for the opposite flange if the corresponding holes are there present.

604.081—Web

Plate girder webs shall have a thickness of not less than 1/170 of the unsupported distance between flanges.

604.09 —Workmanship

All workmanship shall be equal to the best practice in modern structural shops.

The use of a cutting torch is permissible if the metal being cut is not carrying substantial stress during the operation. To determine the effective width of members so cut, 1/8 inch shall be deducted from each gas-cut edge.

604.091—Riveted Construction—Holes

Holes for rivets or unfinished bolts shall be 1/16 inch larger than the nominal diameter of the rivet or bolt. If the thickness of the material is not greater than the nominal

diameter of the rivet or bolt plus $\frac{1}{8}$ inch, the holes may be punched. If the thickness of the material is greater than the nominal diameter of the rivet or bolt plus $\frac{1}{8}$ inch, the holes shall be either drilled from the solid, or sub-punched and reamed. The die for all sub-punched holes, and the drill for all sub-drilled holes, shall be at least $\frac{1}{16}$ inch smaller than the nominal diameter of the rivet or bolt.

Drifting to enlarge unfair holes shall not be permitted. Holes that must be enlarged to admit the rivets shall be reamed. Poor matching of holes shall be cause for rejection.

Holes for turned bolts shall be not more than $\frac{1}{50}$ inch larger than the external diameter of the bolts. All drilling or reaming for turned bolts shall be done after the parts to be connected are assembled; except that if such drilling or reaming after assembly is impracticable, it may be done through steel templates with hardened bushings.

604.092—Riveting

Rivets shall be driven by power riveters, of either compression or manually-operated type, employing pneumatic or electric power. After driving they shall be tight and their heads shall be in full contact with the surface.

Rivets shall ordinarily be hot-driven, in which case their finished heads shall be of approximately hemispherical shape and shall be of uniform size throughout the work for the same size rivet, full, neatly finished and concentric with the holes. Hot-driven rivets shall be heated uniformly to a temperature not exceeding 1950°F .; they shall not be driven after their temperature has fallen below 1000°F .

Rivets may be driven cold if approved measures are taken to prevent distortion of the riveted material. The requirements for hot-driven rivets shall apply except as modified in the Tentative Specifications for Cold-Driven Rivets of the American Institute of Bolt, Nut and Rivet Manufacturers.

604.10 —Welded Construction—Preparation of Material

Surfaces to be welded shall be free from loose scale, slag, rust, grease, paint and any other foreign material, except that mill scale which withstands vigorous wire brushing, may remain. A light film of linseed oil may be disregarded. Joint surfaces shall be free from fins and tears. Preparation of edges by gas cutting shall, wherever practicable, be done with a mechanically guided torch.

604.101—Welded Construction

a. Parts to be fillet welded shall be brought in as close contact as practicable, and in no event shall be separated more than $\frac{3}{16}$ inch. If the separation is $\frac{1}{16}$ inch or greater, the size of the fillet welds shall be increased by the amount of the separation. The separation between faying surfaces of lap joints shall not exceed $\frac{1}{16}$ inch. The fit of

joints at contact surfaces which are not completely sealed by welds, shall be close enough to exclude water after painting.

b. No welding shall be done when the temperature of the base metal is lower than 0°F. At temperatures between 32°F., and 0°F., the surface of all areas within three inches of the point where a weld is to be started, shall be heated to a temperature at least warm to the hand before welding is started.

When welds are being made in parts thicker than 1½ inches, the temperature of the base material adjacent to the welding shall be at least 70°F.

604.102—Welding

The technique of welding employed, the appearance and quality of welds made, and the methods used in correcting defective work shall conform to the American Welding Society Code for Arc and Gas Welding in Building Construction, Section 4-Workmanship.

All complete-penetration butt welds, except when produced with the aid of backing material or welded in the flat position from both sides in square-edge material not more than 5/16 inch thick with root opening not less than one-half the thickness of the thinner part joined, shall have the root of the initial layer gouged or chipped out on the back side before welding is started from that side, and shall be so welded as to secure sound metal and complete fusion throughout the entire intended cross section. Butt welds made with the use of a backing of the same material as the base metal shall have the weld metal thoroughly fused with the backing material. Backing strips may be removed by means of gas cutting, after welding is completed, provided no injury is done to the base and weld metal and the weld surface is left flush or slightly convex with full throat thickness.

604.11 —Finishing

Compression joints depending upon contact bearing shall have the bearing surfaces machined to a common plane after the members are completed.

604.12 —Tolerances

Finished members shall be true to line and free from twists, mends and open joints.

Compression members may have a lateral variation not greater than 1/1000 of the axial length between points which are to be laterally supported.

A variation of 1/32 inch is permissible in the overall length of members with both ends milled.

Members without milled ends which are to be framed to other steel parts of the structure may have a variation from the detailed length not greater than 1/16 inch for members

30 feet or less in length, and not greater than $\frac{1}{8}$ inch for members over 30 feet in length.

604.13 —Erection

The frame of steel skeleton buildings shall be carried up true and plumb, and temporary bracing shall be introduced wherever necessary to take care of all loads to which the structure may be subjected, including equipment, and the operation of same. Such bracing shall be left in place as long as may be required for safety.

604.14 —Field Connections

All field connections may be made with unfinished bolts except as follows:

Rivets or welds shall be used for the following connections; except that turned bolts or high tensile steel bolts may be used in lieu of rivets as provided in Sections 604.063 and 604.064.

Column splices in all tier structures 200 feet or more in height.

Column splices in tier structures 100 to 200 in height, if the least horizontal dimension is less than 40 per cent of the height.

Column splices in tier structures less than 100 feet in height, if the least horizontal dimension is less than 25 per cent of the height.

Connections of all beams and girders to columns, and of any other beams and girders on which the bracing of columns is dependent, in structures over 125 feet in height.

Roof-truss splices and connections of trusses to columns, column splices, column bracing, knee braces and crane supports, in all structures carrying cranes of over 5-ton capacity.

Connections for supports of running machinery, or of other live loads which produce impact or reversal.

Any other connections stipulated in the design plans.

For the purpose of this Section, the height of a tier structure shall be taken as the vertical distance from the curb level to the highest point of the roof beams, in the case of flat roofs, or to the mean height of the gable, in the case of roofs having a rise of more than 1 in 4½. Where the curb level has not been established, or where the structure does not adjoin a street, the mean level of the adjoining land shall be used instead of curb level. Penthouses may be excluded in computing the height of structure.

No riveting or welding shall be done until the structure has been properly aligned.

Rivets driven in the field shall be heated and driven with the same care as those driven in the shop.

In the setting or erecting of steel work the individual

pieces shall be considered plumb or level when the error does not exceed 1 to 500. For exterior columns and columns adjacent to elevator shafts of multiple story buildings, the error shall not exceed 1 to 1000 of the total height of the column.

604.15 —Light Steel Construction

Light steel construction, as defined for the purpose of this code, is that type of construction built in total or in part with steel structural members, and/or panels formed of steel less than $\frac{1}{4}$ inch thick and/or as excepted in Section 604.01. Such members and panels may be formed hot, or formed cold from strip or sheet steel and may be used alone or in combination with other light steel structural members or with other materials when designed in accordance with good engineering practice and when alone or in combination are capable of supporting all required loads without exceeding the allowable unit stresses specified in this Section.

604.151—Design and Materials

a. The "Specifications for the Design of Light Gauge Steel Structural Members" of the American Iron and Steel Institute may be accepted as good engineering practice.

b. Stresses and Material—The unit design stress of steel of all grades shall in no case exceed the yield strength of the steel divided by 1.85. For steel conforming to Grade C ASTM Tentative Specifications for Light Gauge Structural Quality Flat Rolled Carbon Steel (ASTM, A245-48-T or ASTM, A246-48T) the maximum working stresses shall not exceed 18,000 lbs. per sq. in.

c. Thickness—Steel of qualities as specified above, used to form light steel construction members shall be of thickness not less than specified below:

Cellular Construction

Steel floors, panel walls and roof construction:

Compression members	20 U.S. Gauge
Tension members	20 U.S. Gauge
Steel Joists	18 U.S. Gauge
Bearing Studs	18 U.S. Gauge
Steel Beams	16 U.S. Gauge
Ribbed Steel Roof Construction	22 U.S. Gauge

Steel joists are those member that directly support floor and/or roof slabs.

Protection—All structural panels or members formed of light gauge steel shall have one shop coat of paint or equivalent protection.

Tests—At the discretion of the Building Official, tests may be required to prove that the construction meets the requirements of this Code, or certified reports of such tests conducted by an approved and recognized testing laboratory will be accepted.

604.16 —Steel Joist Construction

Steel Joist Construction as governed by the requirements of this Section shall be that type of construction in which decks or top slabs are supported by separate steel members herein designated as "Steel Joists," spaced not further apart than 24" on centers in floors and 30" on centers in roofs, but in no case spaced further apart than the safe span of the top slab, deck or floor. Such steel joists may be made of hot or cold formed sections, strip, or sheet steel, riveted or welded together, or by expanding.

Note—Where steel joists are used at wider spacings than specified in the paragraph above, the construction shall not be considered Steel Joist Construction, but shall be designed and constructed in accordance with recognized engineering practice.

In manufacturing, storage or similar buildings subject to heavy concentrated or moving loads, use of steel joists, for floors shall be limited to live loads not exceeding 125 lbs. per sq. ft., and adequate top slab and lateral support shall be provided to support and distribute such loads.

604.161—Material

Steel shall conform to the requirements of the Standard Specifications for Steel for Bridges and Buildings. (ASTM A7-49T, except that joists formed of strip or sheet steel shall conform to Grade C of ASTM Tentative Specifications for Light Gauge Structural Quality, Flat Rolled, Carbon Steel (ASTM A245-48-T or A-246-48-T).

604.162—Design and Maximum Stress

Open web steel joists shall be designed as a truss, solid web steel joists as a beam. Deck or top slabs over steel joists shall not be assumed to carry any part of the compression stress in the steel joists.

For steel meeting the requirements of Section 604.151 the maximum design stress shall not exceed 18,000 lbs. per sq. in.

Compression chords and diagonals of open web steel joists shall not have a ratio of length (clear distance between welds or attachments) to least radius of gyration in excess of 120, nor shall the unit compression stress exceed 15,000 lbs. per sq. in.

Steel joists or parts of joists formed of strip or sheet steel shall be designed in accordance with recognized engineering practice provided the unit design stress shall in no case exceed the yield strength of the steel divided by 1.85. The "Specifications for the Design of Light Gauge Steel Structural Members" of American Iron and Steel Institute may be accepted as recognized engineering practice.

604.163—Protective Coating

All steel joists shall receive one coat of asphalt base paint or equivalent applied by dipping or spraying or an equivalent protective covering, before leaving the shop.

604.164—Manufacture

All joints of the members that comprise a steel joist shall be made by connecting the members directly to one another by fusion or resistance welds, or by rivets.

In the case of expanded joists, a portion of the metal may be left intact to form a connection.

In the case of nailer joists, using wood nailer strips, such wood nailer strips shall be firmly attached to the top chord of the joist. Such nailer strips shall be of good grade wood at least 1½"x1½" in net section.

604.165—Anchorage

The ends of steel joists shall extend a distance of at least four inches on masonry or reinforced concrete supports, and at least two and one-half inches on steel supports except that where opposite joists butt over a steel support and positive approved means of attachment to the steel support is furnished which will prevent displacement of the member, a shorter bearing length may be used to provide the necessary bearing area. Every third steel joist on concrete or masonry supports shall be anchored thereto with an anchor, equivalent to a ¾-inch round bar. The ends of all steel joists supported on masonry walls shall be bedded in mortar.

All steel joists supported on steel beams shall be secured thereto with an anchor made of not less than a 3/16-inch round bar fastened over the flanges of supporting beams, or other equivalent approved attachment, except that in the case of buildings having a height of more than twice the least dimension of the base, each steel joist shall be welded, bolted or riveted to the supporting steel work.

604.166—Span

The span of the joists shall not exceed 24 times the depth of the steel portion of the steel joist.

604.167—Bridging

As soon as steel joists have been erected and before application of construction loads, bridging shall be installed between them. This bridging shall be adequate to safely support the top chords or flanges against lateral movement during the construction period and shall hold the steel joists in an approximately vertical plane passing through the bearing. The steel joists at the ends of panels shall be braced laterally by anchors or ties at each line of bridging.

When slab reinforcing is of a pre-stressed type; in addition to the bridging, a reinforcing bar shall be welded to the

top cord of steel bar joists. Bars shall be continuous and there shall be one (1) bar adjacent to each line of bridging. All bars shall have six (6) inch 90° bends at the ends and shall be turned down in the wall to form an anchor to take care of lateral stress.

- (a) The number of lines of bridging shall be: one row, near the center, for spans up to 14 feet; two rows, one quarter span apart, for spans 14 to 21 feet; and three rows for spans 21 to 32 feet.
- (b) In the case of steel joists carrying a wood deck or equivalent, the deck may be used as the top member of the bridging system when the deck is securely nailed to the joists.

604.168—Ceiling Protection

Where fire-resistive construction is required, steel joists shall be protected on the underside with a fire-resistive ceiling and shall have a reinforced concrete or gypsum top slab, all as is necessary for the assembly to provide the required degree of fire-resistance as set forth in Chapter 801, provided that where wood joist construction is permitted, steel joists may have wood nailing strip attached to the top chord or top flange, and provided further that where steel joists are used in places where unprotected wood joists are permitted, no ceiling protection need be provided.

604.169—Decks or Top Slabs

Decks or top slabs over steel joists may be of concrete or gypsum poured on metal lath centering or other equally suitable permanent centering, or on removable centering, provided the top chords or flanges of the steel joists are stayed laterally by the top slab.

Precast concrete top slabs, precast gypsum top slabs, wood decks, or steel decks may be used over steel joists provided they are securely anchored to the top chords or flanges of the joists.

604.17 —Steel Roof Deck Construction

This Section shall govern the design of steel roof deck construction used on spans not over 10' and shall govern when in conflict with other provisions of this code. Its provisions shall apply to decks having longitudinal ribs spaced not over 6" on center and formed of metal not less than No. 22 U.S. Standard Gauge in thickness.

Steel roof deck construction may be used on all structures. Where required to be of fire-resistive construction, it shall be protected on the underside with a ceiling, and protected above with insulation to provide the degree of fire resistance specified in Chapter 807.

604.171—Design and Material

The maximum working stress shall in no case exceed the yield strength of the steel divided by 1.85. For steel conforming to Grade C-ASTM Tentative Specifications for Light Gauge Structural Quality, Flat Rolled, Carbon Steel (ASTM A-245-48-T or ASTM A-246-48-T) the working stress shall not exceed 18,000 lbs. per sq. in.

604.172—Properties

For the purpose of determining the structural properties of steel roof decks, the effective width of the top flange between ribs shall be limited to the following percentages:

Thickness of Deck Metal	Width of Top Flange Effective
No. 18 U.S. Standard Gauge	75%
No. 20 U.S. Standard Gauge	62%
No. 22 U.S. Standard Gauge	53%

604.173—Moment and Deflection Co-efficients

Where steel roof deck units extend over three or more spans, a moment co-efficient of 1/10 and a deflection co-efficient of 3/384 shall be used provided deck units are welded to the supports. All other steel deck installations shall be designed as simple spans.

604.174—Maximum Deflection

The maximum deflection of steel roof deck under design live load shall not exceed 1/180 of the clear span except that where plastered ceilings are attached directly to or supported by such deck, the maximum deflection shall not exceed 1/360 of the clear span.

604.175—Anchorage

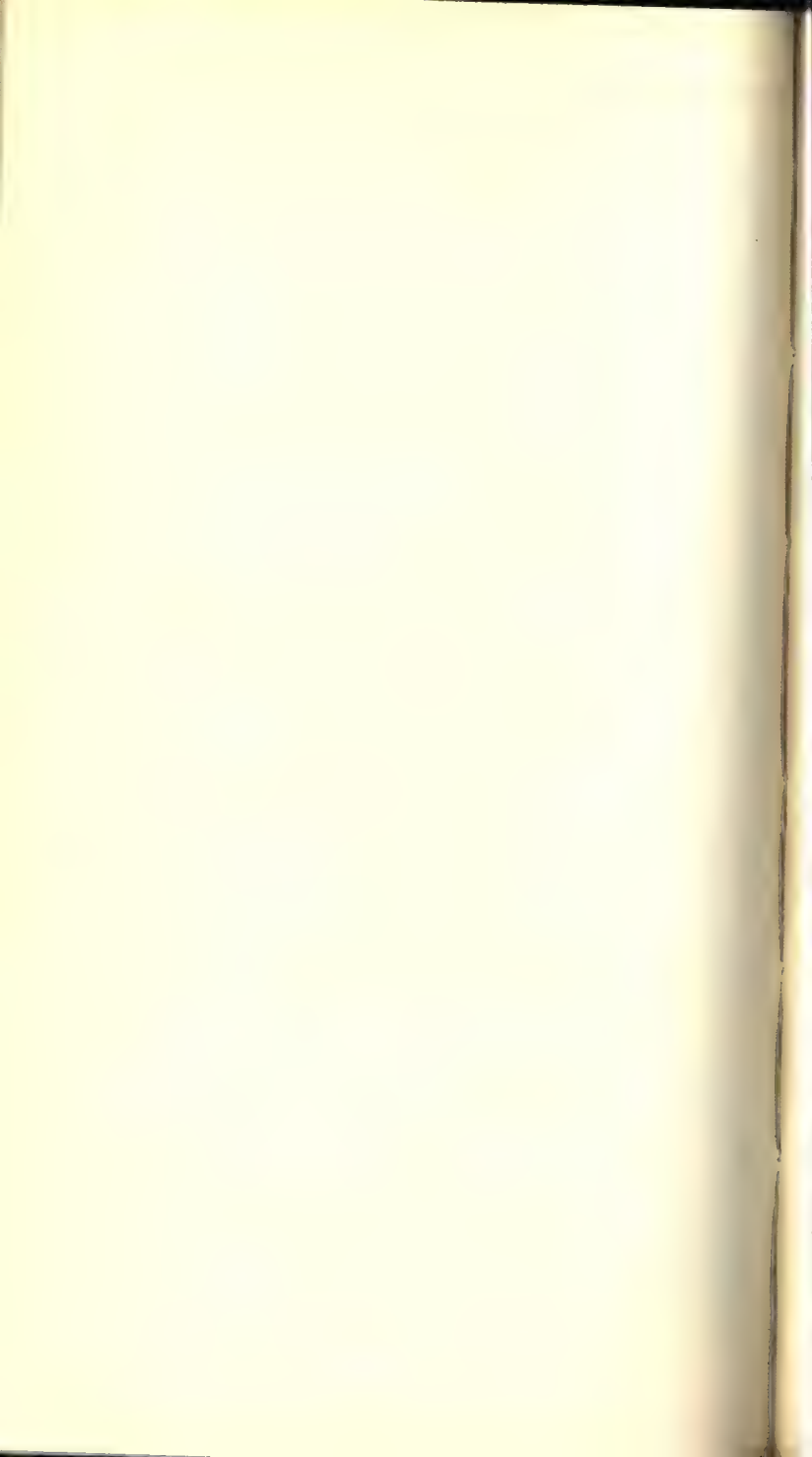
Steel deck units shall be anchored to the supporting frame work to resist the following gross uplifts: 45 pounds per sq. ft. for eave overhang and monitor roofs. 30 pounds per sq. ft. for all other roof areas. The dead load of the roof deck construction may be deducted from the above forces.

604.176—Protection

All steel roof decks shall have one shop coat of paint or equivalent protection.

604.177—Tests

In lieu of designing according to Section 604.171 tests may be made to determine the structural properties of a deck, based on the maximum allowable unit stress and maximum deflection specified herein. Such tests shall be performed on bare metal deck on simple spans supported on knife edges, with concentrated loads applied at the quarter points of the span or uniform distributed loads pneumatically applied.



CHAPTER 605
WOOD
QUALITY AND DESIGN

605.01—General

The quality and design of all wood members used for load supporting purposes in buildings shall conform to the requirements of this Section.

605.011—Workmanship

All members shall be so framed, anchored, tied and braced together as to develop the strength and rigidity necessary for the purpose for which they are used.

605.012—Fabrication

Preparation, fabrication, and installation of wood members, and glues and mechanical devices for the fastening thereof, shall conform throughout to good engineering practices.

605.013—Grade and Species

The species and grade of all wood used for load-bearing purposes shall be shown on the plans filed with the Building Department.

605.014—Design

Except as otherwise specifically provided in this code, the "National Design specification for Stress-Grade Lumber and Its Fastenings," National Lumber Manufacturers Association, 1944, Revised 1948, shall be deemed to be the accepted good engineering practices covering design with any use of stress-grade lumber and joints and fastenings.

605.02—Determination of Required Sizes

All wood structural members shall be of sufficient size to carry the dead and required live loads without exceeding the allowable working stresses as hereinafter specified.

605.021—Size Defined

Minimum sizes of lumber members required by this Code refer to nominal sizes. American Lumber Standard dressed sizes shall be accepted as the minimum net sizes conforming to nominal sizes. Computations to determine the required sizes of members shall be based on the net dimensions (actual size) and not the nominal sizes. If rough sizes or finish sizes exceeding American Lumber Standards dressed sizes are to be used, computations may be predicated upon such actual sizes, provided they are specified on the plans. Nominal sizes may be shown on the plans.

605.022—Load Bearing Members

The Building Official may require the species and grade or the stress-grade of all wood used for load bearing purposes

Table No. 605-A
Stress Grade Lumber
Stresses for Joists, Planks, Beams and Stringers

ALLOWABLE UNIT STRESSES IN POUNDS PER SQUARE INCH					
SPECIES AND COMMERCIAL GRADES	Tension and Extreme Fiber in Bending	Maximum Horizontal Shear	Compression Perpendicular to Grain	Modulus of Elasticity	
Pine, Southern Longleaf					
Select Structural Longleaf	2400	120			
Prime Structural Longleaf	2000	120			
Merchantable Structural Longleaf	1800	120			
Structural Sq. Edge & Sound Longleaf					
No. 1 Structural Longleaf	1800	120	455		1,600,000
No. 1 Longleaf	1600	120			
No. 2 Longleaf	1700	150			
	1250	100			
Pine, Southern					
Dense Select Structural	2400	120	455		
Dense Structural	2000	120	455		
Dense Str. Sq. Edge & Sound	1800	120	455		
Dense No. 1 Structural	1600	120	455		1,600,000
No. 1 Dense					
No. 1	1700	150	455		
No. 2 Dense	1450	125	390		
No. 2	1250	100	455		
	1100	85	390		
Douglas Fir, Coast Region					
Dense Select Structural	2150	145	455		
Select Structural	1900	120	415		1,600,000
1700 # f Defense No. 1					
1450 # f No. 1	1700	145	455		
1100 # f No. 2	1450	120	390		
	1100	110	390		
Cypress, Tidewater Red					
Cypress, 1700 # f Tidewater Red Cypress	1700	145			
1300 # f Tidewater Red Cypress	1300	120	360		1,200,000
Cypress, Southern					
1700 # f Southern Cypress	1700	145			
1300 # f Southern Cypress	1300	120	360		1,200,000

For other species and grades, see National Design Specification.

Table No. 605-A cont.

Stresses for Columns and Compression Members

SPECIES AND COMMERCIAL GRADE	Allowable Unit Stresses in Compression Parallel to Grain (columns) in Pounds per Square Inch of Net Cross Sectional Area									
	Short Columns									
	L/D 11 or Less	L/D 14	L/D 17	L/D 20	L/D 23	L/D 26	L/D 30	L/D 35	L/D 40	L/D 50
Pine, Southern Longleaf										
Select Structural Longleaf	1750	1640	1509	1288	995					
Prime Structural Longleaf	1400	1344	1278	1165	990					
Merchantable Structural Longleaf										
Structural Sq. Edge & Sound Longleaf	1300	1255	1202	1112	971	799	584	430	329	219
No. 1 Structural Longleaf	1300	1255	1202	1112	971					
	1150	1119	1082	1020	922					
Pine, Southern										
Dense Select Structural	1750	1640	1509	1288	995					
Dense Structural	1400	1344	1278	1165	990	779	584	430	329	210
Dense Str. Sq. Edge & Sound	1300	1255	1202	1112	971					
Dense No. 1 Structural	1150	1119	1082	1020	922					
Cypress Tidewater Red										
1450 # c	1450	1338	1208	986						
1200 # c	1200	1136	1062	936	746	583	438	322	247	158
Cypress, Southern										
1450 # c	1450	1338	1208	986						
1200 # c	1200	1136	1062	936	746	583	438	322	247	158
Douglas Fir, Coast Region										
Dense Select Structural	1550	1474	1384	1234	995					
Select Structural	1450	1388	1314	1188	992	799	584	430	329	210
Dense No. 1	1400	1344	1278	1165	990					
No. 1	1200	1165	1123	1050	943					

For other species and grades, see National Design Specification.

to be stated on the plans filed with the Building Department.

605.023—Grades

"Grade," when used in connection with lumber for structural purposes, is a classification with respect to strength.

605.03—Allowable Unit Stresses

Except as hereinafter modified, stresses in pounds per square inch induced under normal loading conditions shall not exceed the allowable unit stresses for the respective species and grade stated in Table No. 605-A; provided, however, other stress grades may be approved and stresses for species and grades not given in the following tables may be established by the Building Official in accordance with the principles set for in the "National Design Specification for Stress-Grade Lumber and Its Fastenings."

Stresses that exceed those given in Table No. 605-A for the lowest stress grade of a species shall be used only when the lumber is identified to be of a higher grade of that species. Such identification shall be by the grade mark of, or certificate of inspection issued by, a lumber grading or inspection bureau or agency recognized as being competent.

605.04—Horizontal Members

Where joists enter stud walls, either exterior or interior, in which the studs are not cut off and capped underneath the joists thus giving bearing support thereto, such joists shall be connected to the studs in an approved manner or may be supported on a wooden ribbon not less than one inch by four inches (1"x4") set snugly into the studs.

Joists under bearing partitions and running parallel thereto shall be doubled and well spiked or separated by solid bridging not more than sixteen inches (16") on centers to permit the passage of pipes.

The bearing surfaces of masonry on which wooden structural members are to rest shall be finished to give true and even support. When less than three feet (3') from the ground, the bearing surfaces of wooden joists, beams, girders, built-up girders, or rafters over six inches (6") in width of bearing, which would otherwise rest directly upon masonry or concrete shall be protected in an approved manner against damage by moisture or other injurious conditions.

All joists shall have a minimum bearing of two inches (2") masonry or reinforced concrete wall shall be separated from any wood members entering the opposite side of said wall by at least four inches (4") of solid masonry.

All joists shall have a minimum bearing of two inches (2") except when supported on a ribbon board and nailed securely to the adjoining stud unless designed for the loads to be supported.

605.05—Wall Anchors and Ties

When timber construction is used in connection with masonry or reinforced concrete walls, the walls shall be tied to the interior timber construction at each floor and roof at horizontal intervals as required by design loads and stresses.

Where the joists, rafters or beams are supported by wooden girders, such girders shall be anchored to the walls so as to furnish resistance as required by the design loads and stresses.

605.06—Header and Tail Joists

Header joists over six feet (6') long and tail joists over twelve feet (12') long shall be hung in joists or beam hangers, or secured by other devices affording equivalent support.

Timbers and header joists more than four feet (4') long shall be doubled.

605.07—Bridging

Wooden cross bridging or metal cross bridging of equal strength shall be placed between joists if the span of the joists is greater than eight feet (8'). The distance between bridging or between bridging and bearing shall not exceed eight feet (8'). Each member of wood cross bridging shall not be less than two inches by three inches (2"x3") nominal.

Solid bridging shall be placed between joists at all points of support, except when resting on ribbons, and at the edges of openings where the flooring is not continued.

605.08—Cutting and Notching

Girders, beams or joists may be notched or bored in any part of the section within three times the beam depth from either support. Such notches or holes shall not exceed one fifth of the depth of beam except at point of support and as hereinafter provided.

Where girders, beams or joists are notched at points of support they shall meet designed requirements for net section in bending and also for shear. The unit shearing stress at such point shall be calculated by the following formula and shall not exceed values set forth in Table No. 605-A.

$$H = \frac{3V}{2bd} \frac{h}{X}$$

WHERE

V=vertical shear at section under consideration

b=width of beam

d=actual depth of beam at the notch

h=total depth of beam

H=allowable unit horizontal shear stress

Where notches or holes are made in other portions of the beam, the net remaining depth of beam shall be used in determining the bending strength.

Section 605.09

Deflection

605.09—Deflection

Floor joists supporting plastered ceiling shall be so proportioned that their deflection under full live load and dead load exclusive of weight of plaster shall not exceed one three-hundred-and-sixtieth ($1/360$) of the span length.

605.10—Laminated Floors

Every member of a solid or laminated floor, consisting of members set closely together on edge, shall be firmly nailed with two nails at each end and at intervals along its length not greater than eighteen inches (18"). The nails used shall be of a length equal to two and one-half times the thickness of a single lamination. Devices of equivalent strength may be used in lieu of nails.

In the case of laminated floors in structures of more than one span, at least two-thirds of the members shall pass over the supports. In any three consecutive members, no two splices shall be nearer to each other than one-quarter of a span length. No member shall be spliced more than one in a distance equal to a span length.

In all single span laminated floors the members forming the floor shall be full length and free from joints.

When laminated floors bear on a masonry wall, suitable anchorage shall be provided capable of resisting the design forces.

605.11—Stud Walls and Partitions

Studs in walls and partitions may be placed with the longest dimension parallel with the wall or partition, provided the studs are considered as columns and comply with the column formulas. Such walls shall have top and bottom plates except when framed as provided in Section 605.04.

605.111—Plates

In bearing partitions the top plate shall be doubled and lapped at each intersection with walls or partitions. Joints in the upper and lower members of the top plate shall be staggered not less than four feet (4').

605.112—Bridging

All stud partitions or walls over ten feet (10') in height shall have herringbone bridging, not less than two inches (2") in thickness and of the same width as the stud, fitted snugly and spiked into the studs at mid-height of stud, or other means for giving equal lateral support to the studs. Herringbone bridging may serve as fire-stopping as required in Section 605.13.

ding shall not be less than three-inch by four-inch (3"x4") or two-inch by six-inch (2"x6") to the bottom of the second floor joists and two-inch by four-inch (2"x4") and three-inch by four-inch (3"x4") stud framing shall be fourteen feet (14') and of two-inch by six-inch (2"x6") stud framing shall be twenty feet (20') unless the wall is supported laterally by adequate framing. Except for one-story buildings no studding shall be spaced more than sixteen inches (16") on center, except that in lieu of this requirement the studs and plates may be designed as a system of columns and beams, provided structural grade material is used.

605.114—Base Plates

Stud walls resting on masonry shall have base plates or sills bolted to the masonry at corners and between corners with bolts not less than one-half inch ($\frac{1}{2}$ ") in diameter, embedded not less than seven inches (7") in the masonry and spaced not more than six feet (6') apart, center to center. These sills shall be not less than the width of the studs nor less than two inches (2") thick.

605.115—Corners and Bracings

Angles at corners where stud walls or partitions meet shall be framed solid so that no lath can extend from one room to another. All exterior and main cross stud partitions shall be effectively and thoroughly braced.

605.116—Pipes in Walls

Stud partitions containing plumbing, heating or other pipes shall be so framed and the joists underneath so spaced as to give proper clearance for the piping. Where a partition containing such piping runs parallel to the floor joists, the joists underneath such partitions shall be doubled and spaced to permit the passage of such pipes and shall be bridged with solid bridging. Where plumbing, heating or other pipes are placed in or partly in a partition, necessitating the cutting of the soles or plates, a metal tie not less than one-eighth inch ($\frac{1}{8}$ ") thick and one and one-half inches ($1\frac{1}{2}$ ") wide shall be fastened to the plate across and to each side of the opening with not less than four 16d nails.

605.117—Chimney Space

Wood lath, furring or framing shall be placed not less than two inches (2") from any chimney and not less than four inches (4") from the back of any fireplace.

605.118—Underpinning

The underpinning of bearing stud walls shall be so constructed as to resist the design forces.

605.119—Headers

All wall openings four feet (4') wide or less shall be provided with double headers not less than two inches (2")

thick, placed on edge, securely fastened together, and such headers shall have two-inch (2") solid bearing to the floor or bottom plate unless other approved framing method or joint devices are used. All openings more than four feet (4') wide shall be trussed or provided with lintels which shall have not less than two-inch (2") solid bearing at each end to the floor or bottom plate.

605.12—Nailing and Fastening

The wooden framework of all buildings shall be connected together in a secure manner, and the connections between the various parts shall be such that all forces will be adequately resisted. The sheathing and the subflooring shall be fastened to the studs, rafters or joists with nails which shall be in length at least two and one-half times the nominal thickness of the sheathing or subflooring. The nailing shall have an average spacing not more than four inches (4") along each stud, rafter or joist.

Exception: For plywood sheathing or subflooring nails shall be not less than sixpenny and shall be spaced not more than six inches (6") along the edges of panels and twelve inches (12") along intermediate supports and shall be at least three-eighths inch ($\frac{3}{8}$ ") from the edge of panel.

605.13—Fire Stops

Firestopping shall be provided to cut off all concealed draft openings (both vertical and horizontal), and form an effective fire barrier between stories, and between a top story and the roof space. It shall be used in specific locations, as follows:

a. In exterior or interior stud walls, at ceiling and floor levels.

b. In all stud walls and partitions, including furred spaces, so placed that the maximum dimension of any concealed space is not over eight feet (8').

c. In furred masonry walls.

d. Between stair stringers at least once in the middle portion of each run, at top and bottom, and between studs, along and in line with run of stair adjoining such portion.

e. Around top, bottom, sides and ends of sliding door pockets.

f. Spaces between chimneys and wood framing; these shall be solidly filled with mortar, loose cinders or other incombustible material placed in incombustible supports.

g. Any other locations not specifically mentioned above, such as holes for pipes, shafting, etc., which would afford a passage for flames.

Fire stops when of wood shall be of two-inch (2") nominal thickness. If width of opening is such that more than one

piece of lumber is necessary, there shall be two thicknesses of one-inch (1") material with joints broken.

605.14—Foundation Ventilation

The space between bottom of floor joists and the ground of any building (except such space as is occupied by a basement or cellar) shall be provided with a sufficient number of ventilating openings through foundation walls or exterior walls to insure ample ventilation, and such openings shall be covered with a corrosion-resistant wire mesh with openings in such mesh not greater than one-half inch ($\frac{1}{2}$ ") in any dimension. The minimum total area of ventilating openings shall be proportioned on the basis of two square feet (2 sq. ft.) for each twenty-five linear feet (25 lin. ft.) or major fraction thereof of exterior wall. Such openings need not be placed in the front of the building.

Minimum clearance between bottom of floor joists and the ground beneath shall be eighteen inches (18").

605.15—Wood Diaphragms

Wood diaphragms may be used to distribute horizontal forces to resisting elements such as walls or partitions, provided the maximum deflection in the plane of the diaphragm, as determined by tests or analogies drawn therefrom, does not exceed the permissible deflection of such wall or partition.

In determining the permissible deflection of walls or partitions, the actual elastic properties of the materials (modulus of elasticity, allowable extreme fiber stresses, etc.) may be determined by tests or other data acceptable to the Building Official, or the assigned values for such properties elsewhere herein provided shall be used.

In determining the maximum horizontal deflection of a proposed wood diaphragm under assumed design loads, data from actual tests of diaphragms corresponding to the type proposed may be used or an analogy may be drawn from data furnished in "The Rigidity and Strength of Frame Walls" published by the U.S. Forest Products Laboratory, October, 1929.

Connecting and anchorage of wood diaphragms to resisting elements shall be provided along all the margins of the diaphragm. Such connections shall be capable of resisting the design loads or forces elsewhere herein prescribed.



ARTICLE VII

Structural Details

CHAPTER 701

EXCAVATIONS, FOOTINGS AND FOUNDATIONS

701.01—Excavations

All excavations for buildings and excavations accessory thereto shall be protected and guarded against danger to life and property. All permanent excavations shall have retaining walls of masonry or reinforced concrete of sufficient strength to retain the embankment together with any surcharged loads. No excavation for any purpose shall extend within one foot (1') of the angle or repose or natural slope of the soil under any footing or foundation, unless such footing or foundation is first properly underpinned or protected against settlement.

Any person making or causing an excavation to be made to a depth of ten feet (10'), or less, below the grade, shall protect the excavation so that the soil or adjoining property will not cave in or settle, but shall not be liable for the expense of underpinning or extending the foundation of buildings on adjoining properties where his excavation is not in excess of ten feet (10') in depth. Before commencing the excavation the person making or causing the excavation to be made shall notify in writing the owners of adjoining buildings not less than 10 days before such excavation is to be made that the excavation is to be made and that the adjoining buildings should be protected. The owners of the adjoining properties shall be given access to the excavation for the purpose of protecting such adjoining buildings.

Any person making or causing an excavation to be made exceeding ten feet (10') in depth below the grade, shall protect the excavation so that the adjoining soil will not cave in or settle, and shall extend the foundation of any adjoining building below the depth of ten feet (10') below the grade at his own expense. The owner of the adjoining buildings shall extend the foundations of his buildings to a depth of ten feet (10') below grade at his own expense as provided in the preceding paragraph.

701.02—Footings and Foundations

Footings and foundations, unless specifically provided, shall be constructed of masonry or reinforced concrete and shall in all cases extend below the frost line. Masonry units used in foundation walls and footings shall be laid up in portland cement mortar. The base areas of all footings and foundations shall be proportioned as specified in Section 601.11.

Footings shall be so designed that the allowable bearing capacity of the soil in tons per square foot as given below shall not be exceeded unless the particular soil on which the building is to be placed shows a greater bearing capacity than that specified in this Section.

Rock	Not more than 20 per cent of the ultimate crushing strength of such rock
Gravel or coarse sand, well cemented	6 tons
Dry, hard clay or corase firm sand (hardpan)	4 tons
Moderately dry clay or moderately dry sand and clay	3 tons
Ordinary clay and sand	2 tons
Soft clay, sandy loam or silt	1 ton

Where the bearing capacity of the soil is not definitely known or is in question, the Building Commissioner may require load tests or other adequate proof as to the permissible safe bearing capacity at that particular location. To determine the safe bearing capacity of soil it shall be tested by loading an area not less thn two square feet (2 sq. ft.) to not less than twice the maximum bearing capacity desired for use. Such double load shall be sustained by the soil until no additional settlement takes place for a period of not less than 48 hours in order that such desired bearing capacity may be used. Examination of sub-soil conditions may be required when deemed necessary.

Foundations shall be built upon natural solid ground where possible. Loam or soil containing organic matter shall not be used to support buildings exceeding one story in height. Where solid natural ground does not occur at the foundation depth, such foundations shall be extended down to natural solid ground or piles shall be used, unless there is a practically level fill of good ground which has been in place a sufficient length of time to settle properly, when such fill may be used.

701.03—Piles

All piles used to support any building or part thereof shall be driven to a reasonably solid bearing in such a manner as not to impair their strength. No pile or group of piles shall be loaded eccentrically.

701.031—Wood Piles

Wood piles shall be of oak, Douglas fir, Southern pine, cedar, or other approved wood containing no evidences of decay. The piles shall be free from short kinks or reverse bends and shall have a uniform taper from butt to tip. A straight line drawn from the center of the butt to the tip shall lie wholly within the body of the pile. The diameter of wood piles at the point shall be not less than six inches (6") and at the butt shall be

not less than ten inches (10") for piles twenty-five feet (25') or less in length, and not less than twelve inches (12") at the butt for piles more than twenty-five feet (25') in length. No piles with spiral grain which exceeds one complete turn in forty feet (40') shall be used. All wood piles and capping shall be cut off and/or placed below mean low water level or below lowest ground water level, with the exception of creosoted piles as covered in this Section.

701.032—Creosoted Piles

Creosoted piles of Douglas fir or Southern pine when treated with Grade 1 creosote under pressure with the full-cell creosote treatment complying with Specification No. 41-b or No. 39-a of the American Wood Preserving Association in such a manner as to provide a final retention of not less than 12 pounds per cubic foot depending upon the nature of the wood.

1. Where the upper portion of the creosoted piling is to be exposed and available for inspection the cut-off may be above ground level or above water level.

2. Where the upper part of the creosoted piling will not be readily available for inspection the cut-off shall be below ground level but may be above ground water level provided the tops of the cut-off piles are treated with three coats of hot creosote and capped with concrete so that no part of the pile will be exposed to the air.

No creosoted piling shall be used which has been so injured in handling or driving as to penetrate the creosoted shell, except in the case of bolt holes and unavoidable framing including the top cut-off, all of which shall be treated with three coats of hot creosote.

The allowable load on wood piles shall be in conformity with the requirements of Section 701.036.

701.033—Concrete Piles

Concrete piles shall be of material complying with the requirements for portland cement, fine aggregate, coarse aggregate and reinforcement as specified in Chapter 603 and steel as specified in Chapter 604. The maximum allowable working stress on any concrete pile shall not exceed 20 per cent of the ultimate compressive strength of the concrete used in the piles, determined by tests as specified in Chapter 603. The maximum allowable load on any pile shall not exceed such working stress multiplied by the average cross-sectional area of the pile. Concrete piles cast in place shall be made in such a manner as to insure the exclusion of any foreign matter and to secure a full-sized shaft. The length of such piles shall be limited to not more than 30 times the average diameter. The diameter of piles cast in place shall be not less than eight inches (8) inches at the point and

shall have an average diameter of not less than eleven (11) inches.

Precast concrete piles shall be sufficiently cured to attain the ultimate strength upon which their use is based, before driving. Such piles shall be reinforced and so handled as not to be fractured in any manner which will affect their durability or strength. Precast concrete piles shall have a diameter at the point of not less than six inches (6") and an average diameter of not less than ten inches (10"). The length of such piles when driven to rock shall be limited to twenty (20) times the average diameter and shall not exceed forty times the average diameter in any other case.

The allowable load on concrete piles shall be in conformity with the requirements of Section 701.036.

701.034—Steel Piles

Rolled structural steel piles shall comply with the requirements for structural steel as specified in Chapter 604. The minimum thickness of metal shall be three-eighths inch ($\frac{3}{8}$ "). The allowable load on structural steel piles shall be in conformity with the requirements of Section 701.036.

701.035—Concrete-Filled Steel Pipe Piles

Concrete-filled steel pipe piles shall have a nominal outside diameter of not less than ten and three quarters inches ($10\frac{3}{4}$ ") and a nominal wall thickness of not less than five-sixteenths inch ($5/16$ "), except that piles having a nominal outside diameter of fourteen inches (14") or over shall have a normal wall thickness of not less than three-eighths inch ($\frac{3}{8}$ "). Concrete filling shall conform to the requirements of this Section for concrete piles. Splices shall develop at least one-third of the full bending strength of the steel section, except that where the piles are required to be designed as columns by the provisions of Section 701.036, splices shall develop the full bending strength of the steel section.

The allowable load on concrete-filled steel pipe piles shall be in conformity with the requirements of Section 701.036. In no case shall the allowable load exceed 7500 pounds per square inch on the steel plus 25 per cent of the ultimate 28-day compressive strength on the concrete, except that where the length of the piles exceeds forty times the nominal outside diameter, the unit load on the concrete shall not exceed 20 per cent of its 28-day compressive strength.

Exception: Where concrete-filled steel pipe piles are driven open-ended to refusal on sound bed rock which is not underlain by a softer stratum, the formula of Section 701.036 may be disregarded and the allowable load may be based upon the unit stresses prescribed above.

701.036—Safe Load

The assumed safe load on a pile shall not exceed the value

given by the following formula, unless such safe load is determined by test loading as provided in this Section.

(a) For a pile driven with a drop hammer

$$P = \frac{2 Wh}{s + 1}$$

(b) For a pile driven with a steam hammer

$$P = \frac{2 Wh}{c + 0.1}$$

Where:

P=Safe load in pounds.

W=Weight of hammer in pounds.

h=Fall of hammer in feet.

s=Average penetration in inches per blow for the last five blows.

No wooden pile shall be loaded in excess of 500 pounds per square inch of the right section of the pile at mid-length.

The safe bearing value of a pile may be determined by a load test, upon due notice to the Building Official. The assumed safe load shall not exceed one-half of the load which shows no settlement for 24 hours, and a total settlement not to exceed 0.01 inch per ton of test load.

Piles standing free in water or very soft soil shall conform with the applicable column formula as stated in these rules and regulations. Piles driven into firm ground may be considered fixed at five feet (5') below the ground surface and in soft material at ten feet (10') below the ground surface.

When precast concrete piles frame into a concrete deck structure, the unsupported length may be taken as two-thirds the distance from the top of the pile to the point of fixity as stated in the foregoing paragraph.

701.04—Caissons

The footings of any structure may be carried down to a firm foundation by isolated piers of reinforced concrete or by open or pneumatic caissons either with or without enlarged base or bell at the bottom. The safe carrying capacity of such shafts or caissons shall not exceed the allowable unit bearing capacity of the soil multiplied by the area of the base or bell at bottom.

701.041—Caissons With Belled Footings

In the case of piers or caissons with belled footings, the slope of the sides of the bell shall not exceed one foot horizontally for each two feet vertically unless properly reinforced.



CHAPTER 702

VENEERED WALLS

702.01—General

Veneer shall not be assumed to add to the strength of any wall.

Exterior veneer shall not be attached to wood at any point more than thirty-five feet (35') above the adjacent ground elevation.

The limitations in this Chapter shall not apply to interior veneer of units five-eighths inch ($5/8"$) or less in thickness.

702.02—Veneer Composed of Masonry Units

The provisions of this Section shall apply to all veneer which is constructed of masonry conforming to the requirements of Chapter 602.

No veneer shall support any vertical load other than the dead load of the veneer above. Veneer above openings shall be supported upon lintels of incombustible material.

Masonry veneer shall be attached to the supporting wall with substantial corrosion-resistant metal wall ties.

Veneer ties shall be not less in thickness than No. 6 W & M gauge wire. Veneer ties shall be spaced not more than twenty-four inches (24") apart horizontally and not more than sixteen inches (16") apart vertically.

Exterior masonry veneer shall be supported upon footings to a height of twenty (20) feet above grade and by incombustible structural supports at the twenty (20) foot level and at each twelve (12) feet vertically thereafter; except, that masonry veneer attached to wood frame walls shall not exceed (20) feet in height and shall be supported entirely upon footings.

702.03—Veneer Composed of Non-Structural Units

The provisions of this Section shall apply to all veneer of materials not regulated by the requirements of Chapter 602.

For the purpose of this Section, veneer of non-structural units shall not be assumed to support any superimposed loads.

Non-structural material used as veneer shall be anchored to the supporting wall by corrosion-resistant metal ties not less in thickness than No. 9 W & M gauge wire, and spaced not more than twelve inches (12") apart both horizontally and vertically.

Exceptions: Approved units, or units of flat tile, stone or terra cotta which are manufactured with scored surface may be cemented to a masonry or concrete wall to or to exterior plaster with portland cement mortar, provided the mortar bond is sufficient to withstand a shear-

ing stress of 50 pounds per square inch after curing for 28 days.

702.04—Glass Veneer

Glass veneer shall not be attached to any exterior wall at a point more than thirty-five feet (35') above the adjoining ground elevation.

Glass veneer units shall be not less than one-eighths inch ($\frac{1}{8}$ ") in thickness. Units less than three-sixteenths inch ($\frac{3}{16}$ ") in thickness shall be not larger in area than one square foot (1 sq. ft.). Units not more than one-quarter inch ($\frac{1}{4}$ ") nor less than three-sixteenths inch ($\frac{3}{16}$ ") in thickness shall not be larger in area than ten square feet (10 sq. ft.) or more than four feet (4') in length.

No unit shall be larger in surface area than ten (10) square feet or more than four (4) feet in any dimension.

Every glass veneer unit shall be attached to the backing by approved corrosion-resistant ties and shall be supported upon shelf angles.

Exceptions: 1. Below a point twenty-two feet (22') above the adjacent ground elevation, the ties may be omitted.

2. Below a point three feet (3') above the adjacent ground elevations, the ties and shelf angles may be omitted.

The mastic shall cover not less than one-half of the area of the unit after the unit has been set in place and shall be neither less than one-quarter inch ($\frac{1}{4}$ ") nor more than one-half inch ($\frac{1}{2}$ ") in thickness

The mastic shall be insoluble in water and shall not lose its adhesive qualities when dry.

Absorbent surfaces shall be sealed by a bonding coat before mastic is applied. The bonding coat shall be cohesive with the mastic.

Glass veneer surfaces, to which mastic is applied, shall be clean and uncoated.

Shelf angles shall be of corrosion-resistant material capable of supporting four times the weight of the supported veneer.

The shelf angles shall be spaced vertically in alternate horizontal joints but not more than three feet (3') apart.

The shelf angles shall be spaced not farther apart horizontally than the width of the supported units.

Exterior glass veneer shall be applied only upon masonry, concrete, or exterior plaster.

Glass veneer units shall be separated from each other and from adjoining materials by an expansion joint at least one thirty-second inch ($\frac{1}{32}$ ") in thickness. There shall be at least one sixty-fourth inch ($\frac{1}{64}$ ") clearance between bolts and the adjacent glass.

CHAPTER 703

FLOOR CONSTRUCTION

703.01—General

Floor construction shall be of materials and structure as specified under Occupancy in Article IV and under Types of Construction in Article V.

All floors shall be so framed and tied into the framework and supporting walls as to form an integral part of the whole building. Fire-resistive standards of floor construction are specified in Chapter 807.

The type of floor construction used shall provide means to keep the beams and girders from spreading by installing ties or bridging.

703.02—Concrete Floors

Concrete slab floors shall be not less than two inches (2") thick. Topping when poured monolithic with the slab may be included as a structural part of the slab. Sleepers for the nailing of a wood floor shall not decrease the required structural depth of the slab unless placed in the direction of span and then shall not be placed more than one-half inch ($\frac{1}{2}$ ") into the slab.

703.03—Steel Joisted Floors

Steel joisted floors shall consist of steel joists as specified in Section 604.16. When used in Type I or Type II buildings they shall have a reinforced concrete or gypsum slab not less than two inches (2") thick placed on and secured to the top thereof, and a fire-resistive ceiling as specified in Chapter 807 on the underside thereof, fully covering and protecting the joists; provided that when such joists are used in places where unprotected wood joists are permitted the steel joists need not be protected with fire-resistive materials as specified above. Fire-resistive ceilings as specified in Section 802.03 shall, except in the case of one-hour fire-resistive construction, be designed and constructed to support a load of not less than 10 pounds per square foot in addition to its own weight.

The reinforced concrete or gypsum slab placed on and secured to the top of the steel joists shall be sufficiently reinforced to support all dead, live or other loads between joists. Joists shall be securely cross-bridged at intervals not to exceed eight feet (8') along the joist length. The lateral unsupported length of the top chord of any steel joist shall not exceed forty times the width of the compression flange.

Bridging shall be provided during the period of construction to adequately support the top chord or flange against lateral movement and such bridging shall be designed to hold each joist in a vertical plane. Sufficient permanent bridging shall be installed to laterally stay the joists and to transmit any horizontal forces in either direction perpendicular to the

direction of the joists. Such bridging shall consist of solid concrete sections, structural steel shapes or plates, portal bridging diagonal rods, or other bridging which will provide equal stiffness. Any row of bridging shall be capable of transferring 500 pounds from each joist to the adjoining joists.

703.04—Mill Constructed Floors

Mill constructed floors shall be not less than three inches (3") nominal splined or tongued and grooved plank covered with one inch (1") nominal flooring laid crosswise or diagonal. Top flooring shall not extend closer than one-half inch ($\frac{1}{2}$ ") to walls to allow for swelling in case the floor becomes wet. Such one-half inch space shall be covered by a molding fastened to the wall and so arranged that it will not obstruct the swelling or shrinking movements of the floor. Corbeling of masonry walls under floor planks may be used in place of such molding.

If laminated floors are used, at least two laminations at the wall shall be omitted until after glazing and roofing has been completed.

703.05—Joisted Wood Floors

Wood joisted floors shall be framed and constructed and anchored to supporting wood stud or masonry walls as specified in Chapter 605. Wood joisted floors need not be fire-protected on the under side except where specifically required under Occupancy in Article IV, Location in Article III, or Type of Construction in Article V.

Girders supporting first floor joists in residence buildings shall be not less than four inches by four inches (4"x4") for spans of five feet (5') or less, or not less than four inches by six inches (4"x6") (placed on edge) for spans not more than seven feet (7').

Floor joists shall have a clearance of not less than eighteen inches (18") between the bottom of the joists and the surface of the ground underneath.

Joists under bearing partitions shall be installed as specified in Chapter 605. All joists, beams and girders shall be framed away at least two inches (2") from all flues and chimneys and at least four inches (4") from the back of any fireplace. All wood floor joists having a span of more than eight feet (8") shall have bridging as specified in Chapter 605.

Solid blocking not less than two inches (2") nominal in thickness and full depth of the joists shall be provided in the following places: over all bearing walls, bearing partitions and around all stairways or other vertical openings; and over all girders, except when joists are not ceiled on the underside thereof. Such solid blocking shall serve as the required bridging specified in Chapter 605.

CHAPTER 704

ROOF CONSTRUCTION AND COVERING

704.01—General

Roof covering shall be as required under Occupancy in Article IV, Location in Article III or Types of Construction in Article V. All roofs shall be so framed and tied into framework and supporting walls as to form an integral part of the whole building.

704.02—Construction

The general requirements for construction of floors as specified in Chapter 703 shall apply to roofs, except that in Type II buildings the roof sheathing shall be not less than two inches (2") nominal in thickness and concrete or gypsum roof slabs shall be not less than two inches (2") in thickness.

Roof trusses shall have all joists well fitted and shall have all tension members well tightened before any load is placed on the truss. Diagonal and sway bracing shall be used to brace all roof trusses. The allowable working stresses of materials in trusses shall be as specified in Chapters 602 and 604. The minimum net section of the members after framing shall be used in determining the strength of the truss at any point.

704.03—Design

The design of the roof construction shall be in accordance with engineering regulations for the materials used.

The allowable span of roof rafters shall be measured from plate to ridge, except that where rafters are braced to ceiling joists and a complete truss is formed, the span shall be considered as the distance between intersecting points of trussing.

Roof framing and trussing shall be thoroughly and effectively angle braced. Roof joists when supported on a ribbon board shall be well nailed to the stud.

704.04—Roof Coverings

Roof covering shall be required over all combustible roof construction and shall be one of the classes set forth in Section 801.01 as required under Occupancy in Article IV, Location in Article III and Type of Construction in Article V.

704.05—Attics: Access and Areas

All buildings shall have access provided to the attic space by means of a stairway or permanent ladder or a scuttle. The openings provided through the ceiling for such access into the attic space shall be not less than two feet by three feet (2'x3') and shall be located in the hallway or corridor

of all Type III and V buildings three stories or more in height.

Type III or V buildings, one or two stories in height, shall have scuttle holes into the attic space which are not less than eighteen inches (18") square.

704.06—Roof Drainage

Roofs of all buildings shall be sloped so that they will drain to gutters and downspouts which shall be connected with conductors to carry the water down from the roof underneath the sidewalk to and through the curb to a discharge source. Overflows shall be installed at each low point of the roof to which the water drains.

CHAPTER 705

STAIRS AND EXITS

705.01 —Purpose

The purpose of this section is to provide minimum standards for safe means of egress for all occupants of every portion of every building.

Every building shall be provided with exits as required by this Chapter. Where there is a conflict between a general requirement and a specific requirement for an individual occupancy, the specific requirement shall be applicable.

This Chapter may be supplemented with any of the methods of computation, standards of design and construction, etc., detailed in Building Exits Code, Eighth Edition, 1946, approved by American Standards Association, A 9.1-1942, excepting Section 10, Alarm Systems, and Section 12, Lighting and Signs, which are incorporated in this code under Chapters 707 and 715.

705.02 —General Requirements

All exits as required for buildings in this code shall comply with the requirements specified in this Chapter for a stairway, ramp or smokeproof tower. Wherever stairways are mentioned, ramps may be substituted when constructed as specified in Section 705.10. A smokeproof tower constructed as specified in Section 705.14 shall be considered as a required stairway.

All stairways shall be constructed of materials permitted for floors as specified under Types of Construction in Article V for that type of building in which such stairways are located, except as specified in Sections 705.16 and 705.17. All stairways of wood construction shall be protected on the under side by not less than one-hour fire-resistive construction as specified in Chapter 605. Metal stairways entirely enclosed as specified in Chapter 801 shall not be required to be fire-protected as required for floors in Article V of this code. The provisions of this Chapter shall not apply to Group A occupancies except as specifically stated in Sections 705.03, 705.08 and 901.14.

705.03 —General Design

All stairways and all platforms, landings and balconies forming a part of such stairways shall be designed to sustain an assumed live load of not less than one hundred (100) pounds per square foot.

There shall be no variation in the width of treads in any flight, and the variation in heights of risers in any flight shall not exceed three-sixteenths inch ($3/16''$). All treads shall have a nosing of not less than one inch ($1''$).

The surface material of stair treads and landings shall be such as not to involve danger of slipping.

Stairways and intermediate landings shall continue with no decrease in width along the direction of exit travel, except that when three or more stairways are required, one-half the required number of stairways may be combined at the second floor level with such combined width extending to the first floor level.

705.04 —Arrangement and Access

One-half of the required number of stairways shall be continued their full width to and through the roof by means of a penthouse in all buildings three (3) stories or more in height; provided, that not more than one stairway shall be required to continue to and through the roof when the roof has a slope of more than six inches (6") for each twelve inches (12") of horizontal projection. In two-story buildings scuttles not less than two feet by three feet (2'x3') shall be provided to and through the roof. Stairways leading to roofs of buildings shall have signs conspicuously placed with letters not less than four inches (4") high indicating such access at the ground floor level.

All stairways shall lead to the street directly or by means of a yard, court or fire-resistive passageway having a width at least equal to the aggregate width of all the exits discharging into it; provided, that not to exceed one-half of the required number of stairs may terminate at the second floor level, provided they lead directly to a street or alley front of the building and are provided with a balcony on the exterior of the building not less than three feet (3') wide and five feet (5') long. Such balcony shall be constructed of incombustible materials and when the floor of such balcony is located more than twelve feet (12') above the sidewalk directly below, such balcony shall be equipped with an approved counterbalanced stairway or ladder.

Where stairways discharge through the fire-resistive passageways such passageways shall be not less than seven feet (7') in clear height and with a width at least equal to the stairway or stairways served by such passageways. All openings into such passageways shall be protected by one-hour fire-resistive doors.

All exits shall be so arranged as to make clear the direction of egress to the exterior of the building and shall be so located that they are readily accessible and visible. When not visible to all occupants, adequate signs shall be provided to indicate their location. For buildings with sleeping rooms and places of detention, exits shall be so arranged with regard to floors that there are no pockets or dead ends greater than twenty-five (25) feet in which occupants may be trapped.

Stairways shall abut on not more than one side of an elevator enclosure.

No portion of any building shall be more than one hundred and fifty (150) feet along the line of travel from the nearest exit, and no corridor exit door shall be more than one hundred (100) feet measure along the line of travel from the nearest exit. All doors providing egress from public hallways and all doors providing egress from the building shall open in the direction of exit travel, except sliding doors as provided in Section 705.05.

Exception: Hospital patient rooms may have doors swinging into the room.

705.05 —Doors

Doors shall not open immediately on a flight of stairs but on a landing at least equal to the width of the door.

Doors giving access to stairways shall swing with the direction of exit travel, but where swinging doors are not practicable sliding doors approved by the Building Official may be permitted. Vertical sliding doors and rolling shutters shall not be used. There shall be no obstruction on stairways or landings to the full swing of doors. Swinging doors in their swing shall not reduce the effective width of stairways or landings to less than thirty (30) inches or when open interfere with the full use of the stairs.

All doors in exit enclosures or providing access to exterior stairways shall be self-closing and be kept normally closed and shall be of not less than one-hour fire-resistive construction, except doors facing a street and at street level may be of unprotected wood.

Revolving doors shall not be used unless exit doors of required width are installed adjacent thereto.

All doors used in connection with exits shall be so arranged as to be opened readily from the side from which egress is made or from both sides when the building is occupied. Locks, if provided, shall not require a key to operate from the inside.

No door shall swing out over a sidewalk, alley or street.

705.06 —Railings

All stairways shall have walls or well-secured balustrades or guards on each side and handrails shall be placed on at least one side of every stairway and stairways exceeding forty-four inches (44") in width shall have handrails placed on each side. Stairways over seven feet (7') wide shall be provided with one or more continuous intermediate handrails substantially supported and the number and position of intermediate handrails shall be such that there is not more than sixty-six inches (66") between adjacent handrails.

Handrails and railings shall be placed thirty inches (30")

above the nosing of treads and ends of handrails shall be returned to the wall.

705.07—Lighting

Every stairway or other means of exit into corridors and passageways appurtenant thereto shall be provided with an adequate system of lighting, either natural or artificial. Lights in the exit signs shall be kept burning at all times that the building served by such stairways or exits is being used or occupied as provided in Chapter 707.

705.08—Detailed Requirements

Stairways and landings, returns and passageways serving exit stairways shall be not less than forty-four inches (44") wide; except, that for dwellings and when serving mezzanines or not more than one family or one apartment in buildings not exceeding two stories in height the required width may be reduced to not less than three feet (3'). All such widths shall be clear of all obstruction; except that handrails attached to walls may project within the required width not more than three and one-half inches (3½") at each side when the stairway is forty-four inches (44") or more in width and on one side when the stairway width is less than forty-four inches (44"). If newels project above tops of rails a minimum clear width of not less than that specified in this paragraph shall be provided between the face of the newel and the face of the wall or newel opposite.

The rise of stairway shall be not more than seven and one-half inches (7½") and the tread exclusive of the nosing not less than ten inches (10") (maximum pitch 37 degrees), and there shall be not more than seventeen risers in any one run between landings; providing, that stairways in dwellings and stairways serving mezzanine floors may have a rise of not more than eight inches (8") and a tread exclusive of the nosing of not less than nine inches (9").

Every required stairway including stairways in Group A occupancies shall have a head room clearance of not less than six feet six inches (6'-6") measured vertically from the nearest nosing to the nearest soffit.

705.09 —Stairway Enclosures

All required stairways and ramps in buildings three stories or more in height, including landings and parts of floors between stairways which lie in the path of travel, shall be enclosed as specified under Occupancy in Article IV, under Types of Construction in Article V, and Chapter 706; except that monumental stairways leading only from the street floor level to the second floor or basement which do not constitute required means of exit in public buildings or stores shall be exempted from the enclosure requirements.

Exit enclosures shall not be used for storage in any manner

whatsoever and shall not contain any material or equipment liable to cause fire, explosion or panic.

At the top of every stairway enclosure a ventilating skylight with a horizontal area of not less than eight square feet (8 sq. ft.) shall be installed as specified in Section 708.02, or in lieu of such skylight and equivalent window opening glazed with plain glass may be provided in the penthouse walls. Fixed openings not less than five hundred square inches (500 sq. in.) in area shall be provided at the top of each enclosure for ventilation.

705.10—Ramps

Wherever stairways are required by this code, ramps with a slope not greater than one foot (1') in eight feet (8') may be substituted.

Ramps shall comply with all the requirements for stairways as to construction, width, enclosures, landing, lighting and ventilation.

Ramps shall be surfaced with an approved non-slip material.

Handrails shall not be required where the slope of the ramp is less than one foot (1') in ten feet (10').

705.11—Horizontal Exits

A horizontal exit shall consist of one or more protected openings through or around an exterior wall or occupancy separation or of one or more bridges connecting two buildings or parts of buildings entirely separated by occupancy separations.

Openings used in connection with horizontal exits shall be protected by one-hour fire-resistive doors as specified in Chapter 801. If swinging doors are used there shall be adjacent openings with doors swinging in opposite directions, with signs on each side of wall indicating the exit door which swings with the travel from that side.

Such doors shall be kept continuously unlocked whenever the building is occupied and be normally closed or be self-closing and equipped with fusible links.

705.12—Signs and Lighting

Signs having white letters not less than six inches (6") high on a green field indicating location of exits shall be provided not only at the exit but at other points in the building wherever necessary to clearly indicate the direction of egress. Lights shall be kept burning during all times that the building is used or occupied.

705.13—Passageways and Corridors

Safe and continuous passageways, aisles, or corridors leading to exits and so arranged as to provide convenient access to exits for every occupant shall be maintained at all times

on all floors and in all buildings. The minimum clear width of any passageway, aisle or corridor shall be three feet (3') at the narrowest point and doors swinging into such passageways shall not restrict the effective width at any point during their swing to less than the minimum width therein required.

705.14—Smokeproof Towers

The stairways, landings, platforms and balconies of smokeproof towers shall be constructed as required for stairways, except that they shall be of incombustible materials throughout, except for handrails which may be of wood. The enclosures shall extend from the street level to a penthouse on the roof of the building and shall be roofed over with incombustible materials. Light and ventilation shall be provided at the top of every such enclosure as required for stairways.

Balustrades on the vestibules and balconies shall be not less than forty-two (42) inches in height.

705.15—Access and Egress

Access to the smokeproof tower shall be provided from each story by means of vestibules opening to the outside on an exterior wall or by means of balconies overhanging an exterior wall but not subject to severe fire exposures. Every such vestibule, balcony or landing shall have an unobstructed length not less than the combined required width of exit doors opening upon such balcony or landing and shall be directly open to a street, alley or yard or to an enclosed court open at the top and not less than fifteen feet (15') in width and six hundred square feet (600 sq. ft.) in area.

Access from the building to vestibules or balconies and to the enclosure shall be through doorways not less than thirty inches (30") wide nor less than seventy-five inches (75") in clear height. These openings shall be provided with self-closing fire doors of not less than one-hour fire-resistive construction swinging in the direction of exit travel; provided that clear wire glass not exceeding seven hundred and twenty square inches (720 sq. in.) in area shall be provided in all such doors giving access to the enclosure from the balcony or vestibule. Where locks or latches are provided they shall be of an approved pressure-release type and shall be so designed as to provide access from the building at every floor and roof level.

Stairways of smokeproof towers shall provide continuous uniform egress from the roof and all stories to street grade. Egress shall be provided at the ground floor level either directly or through a passageway not less than forty-four inches (44") in clear width and eight feet (8') in clear height to a street, yard or alley not less than ten feet (10') in width. The walls of such passageway shall be of not less than four-hour fire-resistive construction and the ceiling and floor

of not less than two-hour fire-resistive construction. The walls of any such passageway shall be unpierced throughout their entire length.

705.16—Location

Every smokeproof tower required by this Code shall be located so as to furnish the best means of egress for the occupants of the building and access shall be provided there to by means of a public room, public hall or passageway not less than thirty-six inches (36") in clear width and in no cases shall access thereto be through another apartment, guest room, office or private room of any nature.

705.17 —Outside Stairways

Outside stairways of the return platform or straight-run type may be used as a required means of exit only for existing buildings not exceeding six stories of seventy feet (70') in height but in no case shall such stairways constitute more than 50 per cent of the required exit capacity. All outside stairways shall be located so as to lead directly to a street or alley or to a yard directly connected with a street or alley.

The stairways, landings, platforms and balconies shall be constructed as specified for stairways in this Chapter, except that they shall be of incombustible materials throughout; provided that stairways serving only the second floor may be constructed of combustible material. Structural metal shall be not less than one-quarter inch ($\frac{1}{4}$ ") thick and shall be so framed as to permit ready access for inspection and painting. All windows and other openings adjacent to such stairways shall be provided with fixed metal covered sash and frames and wire glass or be provided with shutters or doors of one-hour fire-resistive construction.

No part of any such outside stairway shall be within ten feet (10') of a lot line which does not form the boundary of a street or alley.



CHAPTER 706

ENCLOSURE OF VERTICAL OPENINGS

706.01—Enclosures: When Required

Vertical openings are required to be enclosed in certain buildings, depending upon the occupancy of the building, height of building or the type of construction. The vertical openings required to be enclosed are specified under Occupancy in Article IV, and for stairways and ramps are specifically included in Chapter 705.

706.02—Stairway, Ramp, and Elevator Enclosures

When stairways or ramps are required to be enclosed, such shall extend from the lowest point to the highest point required and shall also include a complete passageway not less in width at any point than the required width of such stairway or ramp and such enclosure. All doors opening into such enclosures shall be of metal or shall be metal-clad doors as set forth in Chapter 801, and all windows shall be of wire glass and metal frames and sash; except that when such openings face directly on a street or court and are not within ten feet (10') of an adjacent lot line such protection may be omitted. All such doors shall be self-closing and be kept normally closed.

Walls and partitions enclosing stairways, ramps or elevators shall be of not less than the fire-resistive construction required under Types of Construction in Article V. Enclosing walls of elevator shafts may consist of wire glass set in metal frames on the entrance side only. Elevator shafts extending through more than two stories shall be equipped with an approved means of adequate ventilation to and through the main roof of the building.

706.03—Other Vertical Openings

All shafts, ducts, chutes and other vertical openings not covered in Section 702.02 shall have enclosing walls conforming to the requirements specified under Type of Construction of the building in which they are located when they exceed nine square feet (9 sq. ft.) in area, and all other shafts shall be lined with sheet metal having lock jointed or riveted seams and joints. Combustible material of partitions and floors through which the ducts pass shall be kept at least three inches (3") from the metal lining or be protected by not less than three-eighths inch ($\frac{3}{8}$ ") of plaster or one-fourth inch ($\frac{1}{4}$ ") of asbestos or plasterboard. Openings between any ducts and the floor construction through which they pass shall be filled with mortar or other incombustible material supported by wire baskets that prevent the passage of fire. All doors opening into such vertical shafts shall be of metal or shall be covered on the shaft side by not less than one-fourth inch ($\frac{1}{4}$ ") of asbestos and not less than

26 U.S. gauge metal returned around all edges and well fastened to the door. Windows in such shafts shall be wire glass and metal frames and sash or such frame and sash may be of wood entirely clad with metal of not less than 26 U.S. gauge.

CHAPTER 707

LIGHTING AND SIGNS

707.01—Exitway Lighting Required

As provided for specific occupancy uses and in this Chapter all exitways and units thereof and passageways thereto shall be illuminated to facilitate egress.

Such illumination shall be continuous during the time that the conditions of occupancy require that the exitways be open or available. Artificial lighting shall be employed at such places and for such periods of time as required to maintain the illumination to the full intensities herein specified.

707.02—Intensities

The floors of exitways of buildings used for public assembly or congregation, schools, department stores, factories, mills and other occupancies as required by the several occupancy sections shall be illuminated at all principal points such as angles and intersections of corridors and passageways, stairways, landings of stairs and exit doorways to intensities of not less than 0.5 foot-candle, except for factories, mills, etc., where the intensities may be 0.75 foot-candle and 0.5 foot-candle respectively.

Other buildings not excepted from these provisions shall have the floors of stairways illuminated to intensities of not less than 0.5 foot-candle at principal points and 0.2 foot-candle elsewhere.

Auditoriums and other places of assembly where pictures, motion pictures or other projections are made by means of direct light the illumination of the floors of exit ways may be reduced during such period of projection to intensities of preferably not less than one-fifth ($1/5$) of those specified above. At other times the full intensity of illumination should be as provided herein.

Note: The above prescribed intensities of illumination are minimum, but generally greater intensities should be provided. The additional illumination should be from lights placed alternately with the required emergency lights and supplied from the general lighting circuits or other sources similar to the required emergency lighting sources.

707.03—Source

The lighting source shall be arranged to assure continued illumination of all exitways in cases of emergency caused by the failure of the principal lighting of the building. Where electric current is the source of the lighting of buildings used for public assembly or congregation, the emergency lighting shall be from a source independent of that for the general lighting or shall be controlled by an automatic device which will operate reliably to switch the circuit to an independent

secondary source in the event of failure of the primary source of current.

The requirement for lighting of exits from a source independent of the general building lighting shall apply to:

All places of assembly; except, churches used exclusively for religious purposes, and places of public assembly where assembly room floor area does not exceed 600 sq. ft. and where exit doors are within five (5) ft. of grade level and where there are no balconies and where all exits lead directly to the outside of the building.

Department stores over five thousand (5000) square feet area on any one floor.

Hotels with sleeping accommodations for more than fifty (50) persons.

707.04—Courts and Passageways

Hospitals, sanitariums and corrective institutions.

Places of public assembly which have courts, passages and outside stairways leading away from exit doors shall have illuminations of such courts, passages, and outside stairways of not less than 0.2 foot-candle for a distance of fifty (50) feet from such doors or outlets. These lighting outlets to be supplied from the emergency lighting source.

707.05—Supervision

The lighting and all control apparatus shall be installed so as to be under the supervision of and controlled only by authorized persons.

Current supply shall be such that in the event of emergency within the building or group of buildings concerned, emergency lighting shall be available.

707.06—Installation

The installation of electric work required under this Chapter shall be performed in accordance with prevailing electrical regulations.

707.07—Exit Signs

Exit doors and passageways shall have signs visible from the exit approach indicating the way of egress. For auditoriums or other places of public assembly accommodating two hundred (200) persons or more there shall be placed over each door or doorway to be used for egress a sign with the word EXIT in plainly legible letters not less than six (6) inches high and with principal strokes of such letters not less than three-fourths ($3/4$) inch in width. All other places, where so required by the several occupancy sections, shall have each exit door or exit way marked by signs with plainly legible letters not less than six (6) inches high or by internally illuminated signs with letters not less than four and one-half

(4½) inches high. Signs in corridors and other passageways where necessary to indicate the direction of egress shall have the words TO EXIT with a suitable pointer or arrow indicating the way. The lettering shall be of sizes not smaller than required for the exit signs.

Exit signs shall be over doors or exitways and shall be suitably illuminated by a reliable light source giving an intensity of not less than five (5) foot-candles on the illuminated surface. Such illumination shall be continuous as required for exit ways. Except where otherwise required by law or ordinance exit signs shall have white letters on a green field or for the internally illuminated types shall have green letters of translucent material in an opaque field. Artificial lights giving illumination to exit signs other than the internally illuminated types shall have screens, discs or lenses of not less than twenty-five (25) square inches area made of translucent material to show green on the side approach. The green used for translucent materials shall be of the hue known as signal green or admiralty green.

Note: Green is prescribed for exit signs in conformity with the color scheme adopted for traffic signals. Except where otherwise required by law or other compelling circumstances the light source should give a white light for the better illumination of the sign and the vicinity of the exit door.

707.08—Independent Power Source

Exit signs, where electrically lighted, shall be connected with an independent lighting source.



CHAPTER 708

DOORS, WINDOWS, SKYLIGHTS, BAYS AND BALCONIES

708.01—Doors and Windows

Fire doors where required shall be as specified for occupancy and Type of construction. All such doors shall be self-closing and if not kept normally closed shall be arranged to close automatically with the fusing of an approved fusible link.

Windows required to have metal frames shall be constructed of aluminum, steel or wrought iron rolled shapes or of hollow galvanized sheet iron, as specified for occupancy and Type of construction.

When wire glass is required, it shall mean glass the thickness of which at the thinnest point shall be not less than one-fourth inch ($\frac{1}{4}$ ") and in which a wire netting is embedded. Wire glass shall be set with putty and metal stops.

708.02—Skylights

All skylights constructed with metal frames shall be substantially built with interlocking seams. Frames of skylights shall be designed to carry loads required for roofs as specified in Section 601.05. All skylights, the glass of which is set at an angle of less than 45 degrees from the horizontal, if located above the first story, shall be set at least one foot (1') above the roof. The curbs on which the skylight rests shall be constructed as required for inner court walls or for masonry.

When wire glass is required for skylights the size shall not exceed seven hundred and twenty square inches (720 sq. in.) in area or forty-eight inches (48") in any dimension in any one panel. All glass in skylights shall be wire glass, except that skylights over vertical shafts extending through two or more stories shall be glazed with plain glass as specified in this Section; provided, that wire glass may be used if ventilation equal to not less than one-eighth the cross sectional area of the shaft but never less than four feet (4') is provided at the top of such shaft.

Any glass not wire glass shall be protected above and below with a screen constructed of wire not smaller than No. 12 B. and S. gauge with a mesh not larger than one inch (1"). The screen shall be substantially supported below the glass.

Skylights installed for the use of photographers may be constructed of metal frames and plate glass without wire netting.

Ordinary glass may be used in the roofs and skylights for greenhouses, provided the height of the greenhouse at the ridge does not exceed twenty feet (20') above the grade. The use of wood in the frames of skylights will be permitted

may serve as the outside wall of the chimney.

Chimneys shall extend at least three feet (3') above flat roofs and not less than two feet (2') above the ridge of gable and hip roof or the high point of mansards irrespective of the distance of the chimney from such obstruction to draft.

Chimneys shall be built upon solid masonry or reinforced concrete foundations properly proportioned to carry the weight imposed without settlement or cracking. The chimney shall carry no load except its own weight and such load shall be transmitted to the foundation in such manner as to prevent the shearing or falling off of any part of the chimney. The footing for an exterior chimney shall start below the frost line.

Flues shall be built as nearly vertical as possible and in no case at an angle greater than 30 degrees from the vertical.

When any single flue has an effective area exceeding two hundred square inches (200 sq. in.) the wall shall be not less than eight inches (8") thick and shall have flue lining as specified in this Section, except that when flues become too large for fire clay flue lining, such flues shall be lined with fire brick for a distance of at least twenty-five feet (25') from the point of intake.

There shall be but one connection to a flue irrespective of whether the fuel used be coal, coke, wood, or oil. Ordinary and low pressure heating devices burning solid fuels shall have a minimum effective flue area of not less than the following, and such area shall be provided by a flue having its short dimension not less than two-thirds the long dimension.

Small special stoves and heaters.....	28 sq. in.
Stoves, ranges and room heaters.....	40 sq. in.
Fireplaces (at least 1/12 the replace opening)....	50 sq. in.
Warm air furnaces, steam and hot water boilers..	70 sq. in.

All flues to which large ranges, heating furnaces, boilers, automatic gas water heaters or fireplaces are to be connected shall be subjected to a smoke test before acceptance but the test shall not be made until the mortar has thoroughly seasoned. Such test shall be made in the presence of the Building Official.

709.02—Smokestacks

Steel or iron smokestacks may be used in place of brick chimneys specified in Section 3701, in which case the thickness of the metal shall be not less than one-fourth inch ($\frac{1}{4}$ "). Such stacks when used for manufacturing, for high pressure boilers, furnaces or other similar heating or manufacturing appliances shall be lined with fire brick for a distance of not less than twenty-five feet (25') from the place where the smoke pipe enters and shall be protected on the

outside up to and through the roof of the building with eight inches (8") of masonry or a No. 18 U.S. gauge sheet-metal shield which provides an eight-inch (8") ventilated air space between such shield and the steel or iron stack; provided, that a metal smokestack when located inside of a vent shaft having masonry enclosing walls not less than eight inches (8") thick and having a two-inch (2") air space between the walls and the stack on all sides may have such masonry or metal shield protection omitted. All stacks shall be properly guyed when the height of the stack exceeds 15 times its least diameter.

Smokestacks constructed of not less than No. 10 U.S. gauge steel, with either welded or riveted joints, may be mounted directly upon industrial, heating or power boilers which are designed to support the stack load. A clearance of not less than six inches (6") shall be maintained at all times around such smokestack and any flammable material within eighteen inches (18") of such smokestack shall be protected by one-fourth inch ($\frac{1}{4}$ ") of asbestos covered by sheet metal.

709.03—Gas Vents

Gas furnaces, gas water heaters and other gas appliances which are required to be vented, may in lieu of the chimney required in Section 709.01, be provided with a vent of unglazed fire clay; or concrete tile pipe not less than one-half inch ($\frac{1}{2}$ ") in thickness and having a sleeve or flange not more than twenty-four inches (24") apart and at every joint in such vent pipe. Such sleeves or flanges shall project at least three-fourths inch ($\frac{3}{4}$ ") beyond the outer surface of the joint and shall securely join the sections of such vent and all joints shall be well cemented. The sleeves or flanges shall be securely attached to the portions of the building or structure adjoining such vents and act as a spacer to provide an air space around such vent, or such vent may be entirely enclosed in a galvanized iron pipe with such sleeves or flanges separating the outer pipe at least one-half inch ($\frac{1}{2}$ ") from the clay or concrete vent. The area of any flue or vent shall be not less than the area of the largest vent connection inlet plus 50 per cent of the areas of all other additional inlets, provided that no gas flue or vent shall be less than two and one-half inches ($2\frac{1}{2}$ ") in any internal dimension. No vent connection inlet shall be located at the bottom of any gas vent, and any two inlets must be offset or staggered so that it will be impossible for any horizontal plane to pass through any part of both inlets.

A single galvanized or copper bearing metal vent connection exposed to view in a room throughout its entire length may be used to connect the appliance to the vent. Such metal vent connection shall be not less in diameter than the connections on the appliance and shall be maintained not less

than six (6) inches distant from any combustible portion of the building or the combustible material shall be protected by not less than one-hour fire-resistive construction. Every portion of a vent connection shall have a rise of not less than one (1) inch to the foot from the appliance to the chimney and the length of such connection shall be no greater than the height of the vent from the point at which the vent connection enters to the top of the vent.

Every vent shall extend in as nearly a vertical position as possible and be continuous from the gas appliance to the outside of the building and extend at least two feet (2') above any portion of the roof within fifteen (15) feet of said vent.

No vent connection connected to any gas appliance having pilot provision for automatic or remote control, shall be connected to any chimney flue which is used as a smoke flue for any stove, boiler, heater or other apparatus designed to burn wood, coal, oil or other fuel other than gas unless such pilot provision is so designed that the supply of gas to the main burners in connection therewith will be automatically shut off when combustion of gas is not taking place at the pilot.

709.04—Patent Chimneys

Patent chimneys may be used, except for oil burners, when complying with the requirements of this Code and approved by the Building Official for intended use.

When such chimneys are erected on the outside of a building they shall be supported by a substantial iron bracket attached to the studs or framework of the building with through-bolts. When erected on the inside of a building such patent chimneys shall be provided with a smokeproof clean-out of approved design at or near the floor. The floor on which they are placed shall be protected by not less than eight inches (8") of masonry or terra cotta set on a one-fourth inch ($\frac{1}{4}$ ") metal plate. Partitions enclosing patent chimneys shall have an opening opposite the clean-out on the chimney for the purpose of cleaning the flue.

When such chimneys are used with fireplaces, they shall be supported by a metal plate embedded in mortar at the throat of the fireplace. The metal plate shall provide a means of keeping the one inch (1") air space between flue lining and casing.

All patent chimneys shall be built plumb and without bends. All joints in such chimneys shall be made with cement mortar and the bands covering the joints shall be of not less than 24 U.S. gauge galvanized iron. All patent chimneys shall be braced every six feet (6') in their height by not less than 16 gauge wire secured to the chimney by locks or collars and extending in at least three directions.

Not more than two inlets for smoke pipes will be permitted in any patent chimney. When only one inlet is provided the

flue shall be not less than six inches (6") in diameter and shall be not less than eight inches (8") in diameter where two inlets are provided.

All galvanized iron used for the casing of patent chimneys shall be of 24 U.S. gauge riveted together with rivets not more than three inches (3") apart or seamed and with such seams secured with rivets at the top and bottom of each section. There shall be not less than one inch (1") clearance between the chimney and casing at all points and such casing shall be ventilated by not less than six one-inch (1") holes punched near the top of the chimney above the roof and in each inlet to the chimney.

709.05—Pipes and Thimbles

All smoke pipes shall be as short and straight as possible. Smoke pipes for furnaces, boilers or apparatus burning solid or liquid fuel shall be constructed of black iron of not less than 24 U.S. gauge or masonry and shall fit tightly into the chimney. Galvanized iron shall not be used.

Smoke pipes shall enter the side of chimneys through a fire clay or metal thimble or a flue-ring of masonry. The top of smoke pipe intakes shall be set not less than eighteen inches (18") below sheet metal ceilings, wood lath and plaster or exposed wood framing. Neither the intake pipe nor the thimble shall project into the flue. No wood-work shall be placed within six inches (6") of the thimble. When a smoke pipe enters a chimney breast through a studded-off chimney partition the thimble shall be kept six inches (6") clear of all wood-work.

709.06—Fireplaces

All fireplace walls shall be not less than eight inches (8") thick and if built of stone or hollow units shall be not less than twelve inches (12") thick. The faces of all such minimum thickness walls exposed to fire shall be lined with fire brick, soapstone, cast iron or other suitable fire-resistive material. When lined with four inches (4") of fire brick such lining may be included in the required minimum thickness. All fireplaces shall be connected to a regulation chimney as specified in Section 709.01, or to a patent chimney as specified in Section 709.04.

All fireplaces and chimney breasts shall have trimmer arches or other approved fire-resistive construction supporting hearths. The arches and hearths shall be not less than twenty inches (20") wide measured from the face of the chimney breast and not less than twelve inches (12") wider than the fireplace opening on each side. The arches shall be of brick, stone or hollow tile not less than four inches (4") thick. A flat stone or reinforced concrete slab may be used to carry the hearth instead of an arch if it be properly supported and a suitable fill provided between it and the hearth.

Hearths shall be of brick, stone, tile or concrete. Wood centering under a trimmer arch shall be removed after the masonry has thoroughly set.

False fireplaces for gas or electrical heaters shall not be constructed in imitation of fireplaces unless complying with all the requirements for fireplaces. Gas and electrical space heaters may be installed in recesses not more than six inches (6") in depth, provided the entire recess is constructed of incombustible material. Such recesses shall be labeled by means of a metal plate bearing the words "For Gas and Electrical Appliances Only."

No heater burning solid or liquid fuel shall be placed in a fireplace which does not comply with the requirements of this Section. No such heaters shall be connected to a gas vent flue. No wood shall be placed within eight inches (8") of the jambs or within twelve inches (12") of the top or arch of any fireplace opening.

CHAPTER 710

FIRE EXTINGUISHING APPARATUS

710.01—Automatic Sprinklers; Where Required

Automatic sprinkler systems shall be installed as provided herein when required in buildings or structures of specified occupancy uses.

Reference: Article IV.

Standard automatic sprinklers shall be installed as specified in this Chapter in the following places:

a. (1) In assembly buildings with a working stage; under the gridiron, under the stage floor, under all fly and tie galleries, in all dressing rooms, storerooms, property rooms, carpenter shops, paint shops, passageways and all places back of the proscenium wall. A line of sprinklers shall be installed on the stage side of, and immediately back to the proscenium curtain and not more than five feet (5') above the proscenium arch.

(2) In Group E, occupancies in all floored attic spaces.

b. In all Group L occupancies occupied wholly or in part as a planing mill, box factory, woodworking establishment where lumber is made into a finished product and in which more than two power operated woodworking machines exclusive of saws are used.

c. In all Group L occupancies occupied wholly or in part as a mattress factory used to manufacture, assemble or renovate mattresses or stuffed furniture using cotton, silk floss, mohair or other like materials for packing or stuffing.

d. In all Group L occupancies used as film exchanges.

e. In Group H and I occupancies in any enclosed occupied space or over a stairway, except where the entire construction is as required for Type I buildings, and in all portions of basements or cellars used for storage or maintenance work rooms.

710.02—Detailed Requirements

Every automatic sprinkler system required by this code shall comply in all respects with the regulations of the National Board of Fire Underwriters recommended by the National Fire Protection Association for the "Installation of Sprinkler Equipment" Edition of 1940.

Exceptions: A single water supply equal to the primary supply required by such regulations may be accepted as complying with the requirements of this code. In no case where a connection to a city water main constitutes the source of supply shall such connection be less than four inches (4") in diameter.

Sprinklers required in Section 710.01, may be supplied from the domestic water system and need not comply with

the provisions of this Section except as to pipe sizes and spacing of heads, provided that where the domestic water supply has a pressure less than 15 pounds per square inch, an approved automatic chemical extinguisher may be used in lieu of the sprinklers.

710.03—Dry Standpipes; Where Required

Every building three or more stories in height shall be equipped with one or more dry standpipes.

710.04—Detailed Requirements

Dry standpipes shall be of wrought iron or galvanized steel and together with fittings and connections shall be of sufficient strength to withstand 300 pounds of water pressure to the square inch when ready for service, without leaking at the joints, valves or fittings.

Tests shall be conducted by the owner or contractor in the presence of a representative of the Fire Department whenever deemed necessary and ordered by the Building Official. The tests shall be applied at the top and bottom connections of such standpipes and the owner or contractor shall be responsible for any damage caused by breakage or faulty installation while such tests are being conducted. After such standpipes have been tested, the owner or contractor shall remove all water therefrom.

710.041—Construction

Dry standpipes shall be of such a size as to be capable of delivering 250 gallons per minute from each of any three outlets simultaneously under the pressure created by one fire engine or pumper, based on the existing city equipment available. No part of a dry standpipe system other than hose connections shall be less than three inches (3") in diameter.

Every building three or more stories in height where the area of any floor above the second floor is ten thousand square feet (10,000 sq. ft.) or less shall be equipped with not less than one dry standpipe and an additional standpipe shall be installed for each additional ten thousand square feet (10,000 sq. ft.) or fraction thereof.

Standpipes shall be located within stairway enclosures or as near such stairways as possible or shall be on the outside of, embedded within, or immediately inside of an exterior wall and within one foot (1') of an opening in a stairway enclosure or the balcony or vestibule of a smokeproof tower or an outside exit stairway.

All four-inch (4") dry standpipes shall be equipped with a two-way Siamese fire department connection. All five inch (5") dry standpipes shall be equipped with a three-way Siamese fire department connection and all six inch (6") dry standpipes shall be equipped with a four-way Siamese fire department connection. All Siamese inlet connections

shall be located on a street front of the building and not less than one foot (1') nor more than four feet (4') above the grade and shall be equipped with clapper-checks and substantial plugs. All Siamese inlet connections shall be recessed in the wall or other-wise substantially protected.

All dry standpipes shall extend from the ground floor to and over the roof and shall be equipped with a two and one-half inch (2½") outlet not more than four feet (4') above the floor level at each story. All dry standpipes shall be equipped with a two-way and one-half inch (2½") outlet above the roof. All outlets shall be equipped with gate-valves with substantial chains.

All hose threads in connection with such standpipe installations shall be uniform with that used by the local fire department.

An iron or bronze sign with raised letters at least one inch (1") high shall be rigidly attached to the building adjacent to all Siamese connections and such signs shall read: "Connection To Dry Standpipe."

710.05—Wet Standpipes; Where Required

Every group H and I occupancy of any height and every Group B, C, D, E, F, G, J, K, and L occupancy three or more stories in height and every Group C, D, K or L occupancy over 20,000 square feet in area shall be equipped with one or more interior wet standpipes extending from the cellar or basement into the topmost story, provided that Group F, G, and I buildings having no permanent stage and having a seating capacity of less than 500 need not be equipped with interior standpipes.

710.06—Detailed Requirements

Interior wet standpipes shall be constructed as required for dry standpipes.

Interior wet standpipes shall have an internal diameter sufficient to deliver 50 gallons of water per minute under 30 pounds per square inch pressure at the hose connection, based on the available water supply. Buildings of Groups H and I occupancies shall have wet standpipe system capable of delivering the required quantity and pressure from any two outlets simultaneously. For all other occupancies only one outlet need be figured to open at one time. In no case shall the internal diameter of a wet standpipe be less than two inches (2").

Any approved formula which determines pipe sizes on a pressure drop basis may be used to determine pipe sizes for wet standpipe systems. The Building Official may require delivery and pressure tests on completed wet standpipe systems before approving such system.

Wet standpipes shall be so located that any portion of the

building can be reached therefrom with a hose not exceeding seventy-five feet (75') in length.

In Groups H and I occupancies, outlets shall be located as follows:

On each side of the stage, on each side of the rear of the auditorium and on each side of the rear of the balconies. Where seating capacities are less than 500 the number of locations noted above may be reduced upon the approval of the Building Official. In Group B, C, D, E, F, G, J, K, and L occupancies the location of all interior wet standpipes shall be approved by the Building Official.

All interior wet standpipes shall be equipped with a Siamese fire department inlet connection located on the street front of the building and such connection shall have two inlets for buildings five stories or less in height, three inlets for buildings six to ten stories inclusive in height, and four inlets for buildings more than ten stories in height.

All interior wet standpipes shall be equipped with a one and one-half inch (1½") straightway composition gate-valve in each story including the basement or cellar of the building and located not less than one foot (1') nor more than five feet (5') above the floor.

All hose threads in connection with the installation of such standpipes, including valves and reducing fittings, shall be uniform with that used by the local fire department.

An iron or bronze sign with raised letters at least one inch (1") high shall be rigidly attached to the building adjacent to all Siamese connections and shall read: "Connection to Wet Standpipe."

710.07—Water Supplies

All interior wet standpipes shall be connected to a street water main of not less than four inches (4") in diameter or when the water pressure is insufficient to maintain 30 pounds pressure at the highest hose outlet such standpipe shall be connected to a pressure tank, gravity tank or fire pump. Such supply shall be sufficient to furnish at least 30 pounds pressure at the top most standpipe outlet.

When more than one interior wet standpipe is required in the building, such standpipes shall be connected at their bases or at their tops by pipes of equal size.

Tanks shall have a capacity sufficient to furnish at least 250 gallons per minute for a period of not less than 10 minutes. Such tanks shall be located so as to provide not less than 25 pounds pressure at the topmost hose outlet for its entire supply. Discharge pipes from pressure tanks shall extend two (2) inches into and above the bottom of such tanks. All tanks shall be equipped with a manhole, ladder and platform, drain pipe, water and pressure gauges. Every

pressure tank shall be tested in place after installation and proved tight at a hydrostatic pressure 50 per cent in excess of the working pressure required. Where such tanks are used for domestic purposes the supply pipe for such purposes shall be located at or above the center line of such tanks. Incombustible supports shall be provided for all such supply tanks and not less than a three foot (3') clearance shall be maintained over the top and under the bottom of all pressure tanks.

Fire pumps shall have a capacity of not less than 250 gallons per minute with a pressure of not less than 25 pounds at the topmost hose outlet. The source of supply for such pumps shall be a street water main of not less than four inch (4") diameter or a well or cistern containing a one-hour supply. Such pumps shall be supplied with an adequate source of power and shall be automatic in operation.

Each hose outlet of all interior wet standpipes shall be supplied with a hose not less than one and one-half inches (1½") in diameter. Such hose shall be equipped with a suitable brass or bronze nozzle and shall be not over seventy-five feet (75') in length. An approved standard form of wall hose reel or rack shall be provided for the hose and shall be located so as to make the hose readily accessible at all times and shall be recessed in the walls or protected by suitable cabinets.

710.08—Basement Pipe Inlets

Basement pipe inlets shall be installed in the first floor of every store, warehouse or factory where there are cellars or basements under same, except where in such cellars or basements there is installed an automatic sprinkler system as specified by this code or where the cellars or basements are used for banking purposes, filing safe deposit vaults or similar uses.

All basement pipe inlets shall be of cast iron, steel, brass or bronze with lids of cast brass or bronze and shall consist of a sleeve not less than eight inches (8") in diameter through the floor extending to and flush with the ceiling below and with a top flange, recessed with an inside shoulder, to receive the lid and flush with the finish floor surface. The lid shall be a solid casting and have a ring lift recessed in the top thereof, so as to be flush. The lid shall have the words, "Fire Department Only, Do Not Cover Up," cast in the top thereof. The lid shall be installed in such a manner as to permit its removal readily from the inlet.

The location of such basement pipe inlets shall be approved by the Building Official and shall be kept readily accessible at all times to the Fire Department.

710.09—Approvals

All fire extinguishing apparatus, including automatic

sprinklers, wet and dry standpipes, automatic chemical extinguishers, basement pipe inlets and the appurtenances thereto shall meet the approval of the Building Official and Fire Department, as to installation and location and shall be subject to such periodic tests as may be required.

710.10—Check Valve, Cross-Connection, Back-Siphonage

A check valve shall be installed on each public water connection to a private fire protection system.

710.11 —Flame Protection

All combustible materials, fabrics and woodwork used as draperies or scenery on a stage, and all draperies in the assembly portion of Group H occupancies shall be made flame-proof to such an extent that when contacted by a Bunsen burner or gas flame they shall not show signs of fire, glow or smoldering nor will they communicate flame. The materials to be made flame-proof shall be impregnated and shall not be sprayed.

CHAPTER 711

STAGES AND PLATFORMS

711.01—Stage Ventilators

There shall be one or more ventilators constructed of metal or other incombustible material near the center and above the highest part of any working stage raised above the stage roof and having a total ventilation area equal to at least five per cent of the floor area within the stage walls. The entire equipment shall conform to the following requirements or their equivalent:

a. Doors shall open by force of gravity sufficient to overcome the effects of neglect, rust, dirt, frost, snow or expansion by heat or warping of the framework.

b. Glass, if used in ventilators, must be protected against falling on the stage. A wire screen, if used under the glass, must be so placed that if clogged it cannot reduce the required ventilating area or interfere with the operating mechanism or obstruct the distribution of water from the automatic sprinklers.

c. The doors and other covers shall be arranged to open instantly after the outbreak of fire, by the use of approved automatic fusible links which will fuse and separate at not more than 160°F. A manual control must also be provided by a cord running down to the stage at a point on each side of the stage designated by the Building Official.

d. The fusible link and the cord must hold the doors closed against the force of at least 30 pounds excess counter weight tending to open the door. The fusible links shall be placed in the ventilator above the roof line and in at least two other points in each controlling cord and so located as not to be affected by the sprinkler heads above. Each stage ventilator shall be operated to an open and closed position at least once before each performance.

711.02—Gridirons

Gridirons, fly galleries and pin-rails shall be constructed of incombustible materials and fire-protection of steel and iron may be omitted. Gridirons and fly galleries shall be designed to support not less than 75 pounds live load per square foot.

The main counter-weight sheave beam shall be designed to support a horizontal and vertical uniformly distributed live load equal to not less than five pounds per square foot over the area of the gridiron directly back of the proscenium opening.

711.03—Rooms Accessory to Stage

In buildings having a working stage, the dressing room section, workshops, and storerooms shall be located on the

stage side of the proscenium wall and shall be separated from each other and from the stage by not less than a three-hour fire-resistance separation.

In building having any stage other than a working stage, the dressing room section, workshops and storerooms, shall be separated from each other and from the rest of the building by not less than one-hour fire-resistance separation..

711.04—Proscenium Walls

A working stage as defined in Chapter 411 shall be completely separated from the auditorium by a proscenium wall of not less than four-hour resistive construction. The proscenium wall shall extend not less than four feet (4') above the roof over the auditorium.

Proscenium walls may have, in addition to the main proscenium opening, one opening at the orchestra pit level and not more than two openings at the stage door level, each of which shall be not more than twenty-five square feet (25 sq. ft.) in area.

Openings in the proscenium wall of a working stage shall be protected on each side by one-hour fire-resistive doors. The proscenium opening, which shall be the main opening for viewing performances, shall be provided with a self-closing fire-resistive curtain as provided in Chapter 713.

711.05—Stage Floors

All parts of working stage floors shall be of Type I construction except the part of the stage extending back from and the full width of the proscenium opening, which may be constructed of steel or heavy timbers covered with a wood floor not less than two inches (2") nominal thickness. No part of the combustible construction except the floor finish shall be carried through the proscenium opening. All parts of the stage floor shall be designed to support not less than 125 pounds per square foot.

Openings through stage floors shall be equipped with tight-fitting trap doors of wood not less than two (2) inches nominal thickness.

711.06—Platforms

Walls and ceilings of a platform in an assembly room shall be protected on the platform side with lath and plaster as approved for one-hour fire-resistive construction.

Any usable space under a raised platform of an assembly room shall be of one-hour fire-resistive construction throughout.

711.07—Stage Exits

At least one exit two feet and six inches (2'-6") wide shall be provided from each side of the stage opening directly or by means of a passageway not less than three feet (3') in

width to a street or exit court. An exit stair not less than two feet six inches (2'-6") wide shall be provided for egress from each fly gallery. Each tier of dressing rooms shall be provided with at least two means of egress each not less than two feet six inches (2'-6") wide and all such stairs shall be constructed as specified in Chapter 705. The stairs required in this Section need not be enclosed.

711.08—Stage Switchboard

A protecting hood shall be provided over the full length of the stage switchboard.



CHAPTER 712

MOTION PICTURE MACHINE BOOTHS

712.01—Motion Picture Projection Booths

Motion picture projection booths used with assembly occupancies shall be as provided in this chapter and for the specific occupancy use.

Reference: Article IV.

712.02—Film Storage

Every motion picture machine using flammable films and all such films present in any Group F, G, H, or I, occupancy, shall be enclosed in a booth large enough to permit the operator to walk freely on either side or in back of the machine and shall be not less than seven feet (7') high and have a floor area of not less than fifty square feet (50 sq. ft.) to each motion picture machine in such booth, exclusive of space required for benches, stereopticon machines, spot light machines, etc.

712.03—Storage of Heating Elements

No heating elements, such as rheostats, transformers, resistance boxes, etc., shall be placed in the booth. They must be installed in a separate room. In no case shall the floor space of the booth be lessened in order to accommodate such a room.

712.04—Construction of Booth

The floor of such booth shall be constructed of masonry or reinforced concrete or shall be covered with not less than two inches (2") of masonry. The walls and ceiling shall be of not less than Type IV one-hour fire-resistive construction.

The entrance to booth shall be equipped with two tight-fitting self-closing fire doors and such doors shall open outwardly and shall not be equipped with any latches. They shall be as widely separated as possible.

Intermediate uprights and members in ceiling shall be of sufficient width to permit an air space of three inches (3") between the outer and inner wall covering of metal lath and plaster. Plaster shall be one inch (1") thick. The booth shall be constructed upon steel carriages of sufficient load-carrying strength to properly support the booth and equipment. If steel carriage is used it shall be covered with fire-resistive material. Reinforced concrete carriage or fireproof masonry is likewise permissible.

712.05—Port Openings

All port and lookout openings shall be installed before plastering is applied. This applies to ceiling construction as well.

Machine and observation ports in machine booth walls shall be as three kinds: projection ports, observation ports, and combination observation and spot light ports. These ports shall be limited in size and number as follows: There shall be not more than one projection port for each machine head, including stereopticon machines. The area of each projection port shall be not more than six inches (6") high and eight inches (8") long. There shall be not more than one observation port for each projection port and their area shall not exceed one hundred forty-four square inches (144" sq. in.) each. There shall be not more than three combination observation and spotlight ports and they shall not exceed thirty inches (30") by twenty-four inches (24"). Where the openings in the front wall of the projection booths are larger than the ports specified, they may be reduced to the required size by bolting No. 10 U. S. gauge steel plate over the opening on the booth side of the wall, in such a manner that they cannot be readily removed or moved on the slides. These steel plates shall have the openings of the required size cut in them. There shall be not less than one foot (1') of wall space between openings for combination ports. In no case shall the openings which are to be reduced in size by the steel plate be larger than thirty-six inches (36") square. Each such opening together with any fresh air inlets, shall be provided with a shutter of not less than three-sixteenths inch (3/16") thickness sheet metal large enough to overlap at least one inch (1") on all sides of such opening and arrange to slide without binding. These shutters shall be held normally open by means of shall chains fastened to a 160° F. fusible link, the whole so arranged that the shutters may be easily released and closed either by hand or automatically when released by the fusible link and shall be so designed as to effect a weight of not less than eight pounds on each fusible link. Pieces of film shall not be used in place of fusible links. The shutters shall be so hung that the operation of closing shall be smooth and without noise. The closing of all shutters shall be effected in five seconds.

Fusible links shall be hooked in series in such a manner that when one link is automatically released, all shutters shall close, and the ceiling exhaust fan if not in operation shall be automatically started.

712.06—Ventilation

Every booth shall be equipped with a ventilating inlet not less than three inches by fifteen inches (3" x 15") in area placed near the floor on each of three sides, and protected by wire netting. These inlets shall be constructed with louvres or hoods so that light will not shine through. At the top of every booth there shall be at least a ten inch (10") diameter vent for each motion picture machine. Such vent shall be con-

structed of sheet metal not less than No. 24 U. S. gauge and shall connect into a masonry flue or go directly through the roof and twelve inches (12") above, and shall be provided with an exhaust fan which will produce a complete change of air in the booth every 10 minutes. The exhaust fan shall be controlled by an automatic starting switch connected in series with the shutter control fusible links, arranged to start automatically and run at full capacity. No wood or other combustible material shall be allowed to come within six inches (6") of the vent. There shall be not more than one elbow or change in direction of this metal vent in any attic space. No such vent shall pass through any occupied room unless encased in not less than four inches (4") of solid masonry.

712.07—Furniture and Equipment

All shelves, furniture and fixtures within the booth shall be constructed of metal or other incombustible material. Every motion picture machine shall be securely fastened to the floor to prevent overturning.

712.08—Handling of Film

All films not in actual use shall be stored in metal cabinets or boxes constructed of galvanized iron or steel with metal partitions and shelves. Each such compartment shall have a capacity not in excess of 10 reels of film, and shall have tight self-closing doors of iron or steel. No solder shall be used in the construction of such metal boxes or cabinets.



CHAPTER 713

PROSCENIUM CURTAINS

713.01—General Requirements

Proscenium curtains when required shall be made of incombustible materials constructed and mounted so as to intercept hot gases, flames and smoke, and to prevent glow from a severe fire on the stage showing on the auditorium side within a period of five minutes. The curtain shall be raised and lowered each evening at the close of the performance. The closing of the curtain from the full open position shall be effected in less than thirty seconds, but the last five feet (5') of travel shall not require less than five seconds.

Stages of Group G occupancies need not comply with Section 713.02, but shall be sprinkler equipped as required in Section 710.01.

713.02—Curtain Coverings

A proscenium curtain for stage openings over sixty feet (60') in width shall comply with the regulations contained in "Appendix P" of the building code recommended by the National Board of Fire Underwriters, Fifth Edition, revised reprint, 1934. A proscenium curtain for stage openings sixty feet (60') or less in width, shall be constructed and installed as specified in this Chapter. The curtain shall be made of one thickness of asbestos cloth weighing not less than three and one-quarter pounds per square yard.

The asbestos cloth used in the construction of the curtain shall have incorporated into the yarn before weaving, either monel metal, nickle, brass or other metal or alloy having not less strength than these metals at temperatures up to 1700° F. and not less resistance to corrosion at ordinary temperatures. Asbestos cloth made of long fiber blue crocidolite asbestos may be used in place of chrysotile asbestos cloth of the same weight. The wires used to reinforce the yarn shall be either single or double but the tensile strength of each wire shall be sufficient to support a load of not less than three pounds at ordinary temperatures, and the strength of two strands of yarn and one wire twisted together shall be sufficient to support a load of six pounds. The strength of the cloth in tension when tested by the strip method shall be not less than 160 pounds per inch of width of warp and 52 pounds per inch of filling.

The asbestos fiber of yarns may contain cotton or other combustible fiber not to exceed 20 per cent of the weight of the asbestos. The total carbon content of the cloth shall not exceed 10 per cent of the total weight of the fiber. When required by the Building Official, a sample of the cloth of sufficient size for testing shall be submitted.

In addition to any decoration the curtain shall be painted on both sides with a mineral paint having a silicate of soda binder, which will completely fill the cloth. Filler paint shall have not less than four parts of casein in each 10 quarts of silicate of soda. This paint shall be well brushed into the cloth so that no light or smoke can come through.

713.03—Design and Construction

The curtain shall be made of continuous vertical strips of asbestos cloth. The widths of cloth shall overlap at the seams not less than one inch (1") and shall be sewed with a double row of stitching of asbestos thread.

The curtain shall be wide enough to extend into steel smoke grooves on each side of the proscenium opening at least eight inches (8") and shall overlap the top and sides of the proscenium openings at least twelve inches (12").

Six-inch (6") pockets shall be sewed in the top and the bottom of the curtain to hold the pipe battens; the sides shall be hemmed at least six inches deep. A two-inch pipe batten shall be placed at the top and a one and one-half inch (1½") batten at the bottom. For stage openings over forty feet (40') in width the bottom batten shall be not less than two and one-half inches (2½") in diameter. The battens shall be reinforced at the joints with twelve-inch (12") sections of pipe housed and riveted.

The curtain shall be held to the steel guides in the smoke pockets with substantial roller grips riveted or bolted to the side hem, not more than eighteen inches (18") on center. Each roller grip shall be fastened to the curtain with not less than three bolts or rivets.

No. 16 U. S. gauge galvanized metal shall be bent and placed vertically along each side hem of the curtain material, so that both faces of the hem are covered not less than six inches (6"). This metal edging shall be fastened to the side hem with rivets spaced not more than six inches (6") on center.

The top of the curtain shall have a smoke stop fitted to make it as smoke-tight as practicable. The bottom of the curtain shall have a yielding pad of incombustible material not less than three inches (3") thick to form a seal against the floor.

713.04—Operating Equipment

Smoke grooves which protect the sides of the curtain shall be of structural steel shapes and plates not less than one-quarter inch (¼") thick. These grooves shall be not less than fourteen inches (14") deep and six inches (6") wide and shall be set back from the face of the arch at least six inches (6"). Grooves shall extend from the stage floors to a point three feet (3') above the top of the raised curtain,

and shall be securely bolted to the proscenium wall. Details of the grooves shall be submitted to the Building Official and Fire Department for approval.

Steel tracks shall be built into the smoke grooves upon which shall travel the roller curtain guides. This track must be so installed that it is held rigidly in place and so that roller guides will operate smoothly. Safe support and smooth operation are required with a wind load of one pound per square foot over the entire area of the curtain.

Support for the curtain shall be by means of one-quarter-inch ($\frac{1}{4}$ ") flexible steel cables for curtains forty feet (40') or less in width, and three eighths-inch ($\frac{3}{8}$ ") flexible steel cables for curtains over forty feet (40') in width. These cables shall be spaced not more than twelve feet (12') on centers, and the end overhang shall be not more than fifteen inches (15"). Supporting cables shall be tied to the top batten with a clove-hitch and the end secured with two iron rope clips. A substitute method of attachment will be allowed if approved by the Building Official.

The supporting cables shall pass through sheaves in the gridiron and over to the counter-weight guides and shall fasten to the counter-weight by means of three-eighths inch ($\frac{3}{8}$ ") turn-buckles with clove-hitches and cable slips. Turn-buckles shall be locked to prevent backing out. Weight of the curtain shall be evenly divided on the cables.

There shall be safety stay chains of straight welded link fastened to the top curtain batten of sufficient strength to support safely the weight of the curtain. There shall be one more stay chain than the number of supporting cables and, except for the stay chains at the ends of the curtain, shall be centered between the supporting cables. Stay chains shall be securely attached to the top batten of the curtain and thence to the gridiron, if of steel construction, or shall be bolted through the proscenium wall with three-fourths-inch ($\frac{3}{4}$ ") bolts. Safety chains shall be so adjusted that they support the curtain when it is lowered and the bottom batten is resting on the pad supported by the floor.

All cables shall be carried over head and loft blocks fitted with ball or roller bearings of ample capacity to accommodate the weight at the speeds required. Grooves in the blocks shall be machined properly to cradle and protect the cable. All blocks supporting the proscenium curtain shall be supported on the proscenium wall by means of steel brackets of suitable size safely to carry the weight, or shall be mounted on structural steel beams.

Blocks shall be installed so that the head-block is sufficiently higher than the loft blocks to prevent cables from fouling loft block housings.

Diameters of the block shall be a minimum of twelve inches

(12") for three-line sets and sixteen inches (16") for all other sets.

The mechanism and devices for controlling the curtain shall be of simple design and shall be positive in operation. Opening of the curtain shall be by hydraulic or electric power. For curtains where the over-balance on the curtain side does not exceed 150 pounds, manual operation may be used. In this case, manual operation will be allowable only if a method is provided which allows the curtain and counterbalance to be approximately equal under normal conditions, but which adds the required over-weight on the curtain side automatically in case of an emergency.

Emergency releases shall be by gravity obtained by over-balancing the curtain. The emergency control line shall be of cotton sash cord, fitted with not less than four fusible links, one on each side of the stage and two overhead in the gridiron, which when the links are fused or the sash cord burned will allow the curtain to lower itself automatically. This control line shall extend up both sides of the proscenium arch and across the gridiron, and shall be so arranged that when released it will also automatically open the stage ventilators.

On each side of the proscenium arch, at the location in plain view shall be located an easily read sign, bearing the inscription: "In case of fire, cut line to lower fire curtain," with an indicator pointing to the location of a knife for that purpose. The knives shall be attached to the wall by a chain sufficiently long to reach the release line.

For electric operation there shall be installed push buttons plainly marked: "Fire Curtain—stop; Fire Curtain—down." One set of control buttons shall be installed on each side of the proscenium opening. For hydraulic or manual operation the endless line shall be marked plainly with an arrow pointing the direction for closing.

For manual operation the operating hand line shall be not less than three-fourths inch ($\frac{3}{4}$ ") diameter manila rope secured to the top and bottom of the counterweight arbor, and shall pass under a floor block, adjustable for tension, of not less than twelve-inch (12") diameter.

The top and bottom counterweight sections of the arbor shall be of cast iron, sufficiently heavy to accommodate safely the loads. The top and bottom sections shall be connected with rods not less than three-fourths-inch ($\frac{3}{4}$ ") diameter, with one tie-plate for every four feet (4') of rod. There shall be smooth grooves on the ends of the top and bottom weights which engage the steel guides. Intermediate weights shall be of cast iron, grooved to drop into place on top of the lower carrying weight. The turnbuckles connecting the supporting cables to the top weight shall be attached to the eye-bolts passing through the top weight.

Counterweight guide tracks shall be structural T's or angles, properly tied together and securely anchored to the proscenium wall. All joints where the counterweight travels shall be ground smooth and a liberal coating of grease shall be applied to the tracks. These guides shall extend from the gridiron a length equivalent to the length of the arbor, plus the travel of the curtain, plus five feet (5'). The specified length shall be considered as the minimum. A structural steel stop shall be provided at the bottom of the arbor.

For proscenium curtain in which the overbalance is in excess of 150 pounds, an approved adjustable checking device shall be installed to check the speed of fall during the last five feet (5') of travel and an alarm shall be installed at the center of the top of the proscenium arch, which will sound when the curtain is descending through the emergency release.

713.05—Tests

The complete installation of every proscenium curtain shall be subject to operating tests and any theater in which such proscenium curtain is placed shall not be opened to public performance until the proscenium curtain has been accepted and approved by the Building Official.

713.06—New Designs

Curtains of other designs and materials, when not obviously of greater fire resistance than specified in this Chapter, shall before acceptance be subject to the standard fire test specified in Chapter 801, as applicable to non-load-bearing partitions; except, such test shall be continued only for a period of five minutes unless failure shall have occurred previously. The unexposed face of the curtain shall not glow within a period of five minutes nor shall there be any passage of smoke or flame through the curtain.



CHAPTER 714

LATHING AND PLASTERING

714.01—General

Lathing and plastering shall be done in the manner and with the materials specified in this Chapter, and when required for fire protection shall also comply with the provisions of Chapters 801 and 802.

No plaster shall be applied until the lathing has been inspected and approved by the Building Official.

The Building Official may require that test holes be made in the walls for the purpose of determining the thickness of the plaster, provided the permit holder has been notified 24 hours in advance of the time of making such tests.

714.02—Materials

Sand shall be washed sand conforming to A.S.T.M. "Standard Specifications for Sand for Use in Plaster" (C35-527); except that when used with portland cement for scratch coat plastering, the amount of sand retained on a No. 8 sieve shall be not less than 10 per cent nor more than 30 per cent.

Gypsum plaster shall conform to A.S.T.M. "Standard Specifications for Gypsum Plasters" (C28-50).

Lime shall conform to the requirements of Federal Specification SS-Q-351 "Standard Specifications for Quicklime for Structural Purposes," or SS-L-351 "Standard Specifications for Hydrated Lime for Structural Purposes."

Lime putty shall be made from quicklime or hydrated lime, and shall be prepared in an approved manner, stored and protected for an approved period of time.

Keene's cement shall conform to A.S.T.M. "Standard Specifications for Keene's Cement" (C61-50).

Portland cement shall conform to A.S.T.M. "Standard Specifications for Portland Cement," Types I, II, or III (C150-52), except with respect to insoluble residue.

Approved types of plasticity agents may be added to portland cement, Types I or II, in the manufacturing process or when mixing the plaster, but in no case shall the amount of plasticity agent exceed 10 per cent of the volume of cement in the plaster mixture.

Wood lath shall conform to the requirements of Section 13 (b) of A.S.A. "Standard Specifications for Gypsum Plastering, Including Requirements for Lathing and Furring" (A42. 1-1950).

Fiber insulation lath shall be manufactured from wood or other vegetable fiber in accordance with "Federal Specifications for Insulating Fiberboard" (LLL-F-321b).

Gypsum lath shall conform to A.S.T.M. "Standard Specifications for Gypsum Lath" (C37-50), and shall be not less than three-eighths inch ($\frac{3}{8}$ ") in thickness.

Metal and wire lath, metal accessories and channels shall conform to the requirements of Section 13 of A.S.A. "Standard Specifications for Gypsum Plastering Including Requirements for Lathing and Furring" (A42. 1-1950).

714.03—Interior Plastering: Lathing

For gypsum wood, and fiber insulation laths, the distance between supports shall not exceed sixteen inches (16").

Internal angles, external angles, coves, arches and junctures between wood, fiber insulation, gypsum lath and other plaster bases shall be reinforced with cornerite, except where metal or wire laths are carried around such intersections.

No interior lath shall be applied until all exterior framing is covered.

Gypsum lath shall be nailed to wood supports at intervals not to exceed five inches (5") with 13 gauge, one and one-eighth ($1\frac{1}{8}$ "), three-eighths inch ($\frac{3}{8}$ ") flathead, galvanized or blued nails and shall be secured to horizontal or vertical metal supports by means of approved special clips.

Joints between walls and ceilings shall be staggered. Lath shall be applied with joints broken in each course. The laths shall be spaced not more than one-quarter inch ($\frac{1}{4}$ ") apart.

Wood lath shall be spaced not less than one-quarter inch ($\frac{1}{4}$ ") nor more than three-eighths inch ($\frac{3}{8}$ ") apart at edges, one-quarter inch ($\frac{1}{4}$ ") apart at ends, and shall be nailed with 3d fine, 16-gauge, blue nails, full driven. Joints shall be broken every seventh lath and above or below all openings.

Lath shall run approximately at right angles to the supporting members, and no lath shall extend through any wall.

Wood lath shall be thoroughly soaked before being nailed in place, and kept damp until plaster is applied.

Fiber insulation lath shall be nailed to wood supports at intervals not to exceed four and one-half inches ($4\frac{1}{2}$ ") with nails of the following sizes, placed not less than three-eighths inch ($\frac{3}{8}$ ") from the ends, and not less than one-half inch ($\frac{1}{2}$ ") from shiplapped, tongued and grooved, or interlocking edges:

For one-half inch ($\frac{1}{2}$ ") lath—one and one-eighth inch ($1\frac{1}{8}$ ") fiberboard nails or 6d box nails.

For one-inch (1") lath—one and three-fourths inch ($1\frac{3}{4}$ ") fiberboard nails or 4d box nails.

End joints, except in interlocking type lath, shall be not less than three-sixteenths inch ($\frac{3}{16}$ ") wide. Shiplapped,

tongued and grooved, or interlocking edges shall be fitted to contact.

a. The weight of metal and wire lath and the spacings of supports shall conform to the requirements set forth in Table No. 714-A.

Table No. 714-A
Weights of Metal and Wire Lath

Types of Lath	Weight (lbs. per sq. yd.)	Maximum Spacing of Supports	
		For Walls	For Ceilings
Wire Lath	2.48	16'	12"
Flat Expanded	2.5	16'	0
Flat Expanded	3.4	16'	16"
Flat Rib	2.75	16'	16"
Flat Rib	3.4	24'	24"
$\frac{3}{8}$ " Rib	3.0	24'	24"
Sheet Lath	4.5	24'	24"

b. Metal and wire lath shall be lapped at least one mesh at side and ends, but need not exceed one inch (1").

c. Metal and wire lath shall be attached to vertical wood supports at not to exceed six-inch (6") spacing with not less than 4d common nails driven to a penetration of at least three-quarters inch ($\frac{3}{4}$ ") and bent over to engage not less than three strands of lath. Metal and wire lath shall be attached to ceiling joists or other horizontal wood supports with not less than one and one-half inch ($1\frac{1}{2}$ "), 11 gauge, barbed nails with a head not less than seven-sixteenths inch ($\frac{7}{16}$ ") in diameter or an equivalent approved attachment.

d. Metal and wire lath shall be attached to horizontal and vertical metal supports at not to exceed six-inch (6") spacing with not less than No. 18 W & M gauge, galvanized annealed wire, or an equivalent approved attachment.

714.04—Reinforced Non-Bearing Partitions

Where reinforced plaster or gunite partitions are used they shall have vertical steel or iron channels with a depth of not less than one-third the thickness of the partition, made of not less than No. 16 U. S. gauge metal and spaced not more than twenty-four inches (24") on center. They shall be securely fastened and anchored to adjoining framing members.

Hollow non-bearing partitions of reinforced plaster or

gunitite shall have a shell thickness of not less than three-fourths inch ($\frac{3}{4}$ ").

Reinforcement shall be as set forth in Table No. 714-A. The minimum thickness of reinforced plaster or gunite partitions shall be not less than one and one-half ($1\frac{1}{2}$) inch nor one eighty-fourth of the distance between supports.

714.05—Interior Plastering: Suspended and Furred Ceilings

Suspended or furred ceilings shall be designed to meet the requirements of this Section, or shall be designed for a live load of 10 pounds per square foot.

Main runners shall be hot rolled or cold rolled steel channels, and shall be not less than the sizes and weights set forth in Table No. 714-B.

Table No. 714-B

Sizes of Main Runners in Suspended and Formed Ceilings

Distance Center to Center Size of Hangers		Main Runners	
		Hot Rolled	Cold Rolled
Up to 2 feet	$\frac{3}{4}$ "	300 lb./1000 ft.	16 ga. with $\frac{3}{8}$ " flanges
Up to 3 feet	1 "	410 lb./1000 ft.	16 ga. with $\frac{3}{8}$ " flanges
Up to 4 feet	$1\frac{1}{2}$ "	650 lb./1000 ft.	16 ga. with $\frac{3}{8}$ " flanges

Cross furring for various spacings of main runners or other supports shall be not less than as set forth in Table No. 714-C.

Table No. 714-C

Sizes of Cross Furrings In Suspended and Furred Ceilings

Distance Center to Center of Main Runner	Size of Cross Furring	Maximum Spacing
Up to 2 feet	$\frac{1}{4}$ " pencil rods	12"
Up to 3 feet	$\frac{3}{4}$ " channels	24"
Up to 4 feet	$\frac{3}{4}$ " channels	16"

Cross furring shall be securely attached to the main runners or other supports by not less than two strands of No. 16 W & M gauge galvanized wire or equivalent approved attachments.

Hangers for suspended ceilings shall be not less than No. 8 W & M gauge galvanized wire, fastened to or embedded in the structural framing, masonry or concrete. Not less than two strands of No. 14 W & M gauge galvanized wire or equivalent approved attachments shall be used to attach carry members to joists or beams.

Hangers shall be saddle tied or wrapped around main runners so as to develop the full strength of the hangers. Lower ends of flat hangers shall be bolted with three-eighths inch ($\frac{3}{8}$ ") bolts to runner channels, or bent tightly around runners and bolted to the main part of the hanger.

714.06—Interior Plastering: Number of Coats and Thickness

Plastering with gypsum, hardwall, lime or cement plaster shall be three-coat work when applied over metal wire lath, and shall be not less than two-coat work when applied over other plaster bases allowed in this Chapter.

Lime or cement plaster shall not be applied directly to fiber insulation lath or gypsum lath.

In no case shall a brush coat be accepted as a required coat where the three-coat work is required by this Section.

Grounds shall be installed to provide for the following thickness of plaster, from face of plaster base to finished surfaces as set forth in Table No. 714-D.

Table No. 714-D
Required Thickness of Interior Plaster

Type of Lath	Thickness of Plaster
Metal or wire lath	$\frac{5}{8}$ " Minimum
All other types allowed in Chap. 46	$\frac{1}{2}$ " minimum

If monolithic concrete ceiling surfaces require more than three-eighths inch ($\frac{3}{8}$ ") of plaster to produce desired lines or surfaces, metal lath or wire lath shall be attached thereto.

714.07—Interior Plastering: Proportioning and Mixing

The base coat shall be mixed and proportioned in accordance with the following procedure.

a. **Gypsum or Hardwall Plaster.** The first coat on all types of lath shall be mixed in the proportions of 1 part of gypsum neat plaster to not more than $2\frac{1}{2}$ parts of sand, by weight.

The first coat on masonry surfaces (except monolithic concrete) and brown (second) coat in all three-coat work shall be mixed in the proportions of 1 part of gypsum neat plaster to not more than 3 parts of sand, by weight.

The second coat for all three-coat work shall be mixed in the proportion of one part of gypsum or hardwall plaster to not more than three parts of sand by weight.

b. **Wood Fiber Gypsum Plaster.** Wood fiber gypsum plaster shall be mixed with water only, for use on all types of lath, and shall be mixed in the proportion of one part of plaster to one part of sand by weight for use on masonry.

c. **Lime Plaster.** The first coat for three-coat work on metal and wire lath shall be composed of eleven cubic feet (11 cu. ft.) of lime putty or 500 pounds of hydrated lime, 150 pounds of Keene's cement and six pounds of fiber to one cubic yard (1 cu. yd.) of sand.

The second coat for three-coat work on metal and wire lath and for two-coat work on wood lath, brick, tile or concrete, shall be composed of ten cubic feet (10 cu. ft.) of lime putty or 450 pounds of hydrated lime, 150 pounds of Keene's cement and four pounds of fiber to one cubic yard (1 cu. yd.) of sand.

d. **Portland Cement Plaster.** For three-coat work, the first two coats shall be as required for the first two coats of exterior work.

The finish coats shall be mixed and proportioned in accordance with the following procedure:

a. **Smooth white finish.** Mixed in the proportion of not less than one part gypsum gauging plaster of Keene's cement to three parts lime putty by volume, or a prepared gypsum trowel finish.

2. **Sand-float finish.** Mixed in the proportion of one part gypsum neat unfibred plaster to not more than two parts sand by weight, or one and one-half parts of Keene's cement to two parts of lime putty and not more than four and one-half parts of sand by volume, or a prepared gypsum sand-float finish.

c. **Keene's Cement Finish.** Mixed in the proportions of three parts Keene's cement to one part lime putty, by volume.

d. **Lime Sand Float Finish.** Shall be mixed in the proportion of one part of gypsum gauging plaster or Keene's cement, three parts of lime putty, and three parts of sand by volume.

e. **Interior Stucco Finish.** Shall be mixed in the proportion of one part of Keene's cement, two parts of lime putty, and three parts of white sand by volume, or prepared color finish.

Finish Coats for interior portland cement plaster may be:

a. As required for the third coat of exterior stucco.

b. As gauged cement plaster mixed in proportion of one part portland cement to not more than two and one-half parts of lime putty and not more than four parts of sand by volume.

c. Smooth white finish, mixed in the proportion of not less than one part gypsum gauging plaster or Keene's cement to three parts of lime putty by volume.

d. Keene's cement finish, mixed in the proportion of three parts Keene's cement to one part lime putty, by volume.

e. Lime sand-float finish shall be mixed in the proportion of one part gypsum gauging plaster or Keene's cement, three parts lime putty, and three parts of sand, by volume.

f. Interior stucco finish shall be mixed in the proportion of one part of Keene's cement, two parts of lime putty, and three parts of white sand by volume, or a prepared color finish.

Exception: When finishes c, d, e, or f, are used, portland cements having plasticity agents added in the manufacturing process shall not be used in the coat to which this finish is applied.

714.08—Interior Plastering: Application of Plaster

a. **Gypsum Plaster.** The scratch coat shall be applied with sufficient material and pressure to form a full key or bond.

For two-coat work it shall be doubled back to bring the plaster out to grounds and straightened to a true surface and left rough to receive the finish coat. For three-coat work, the surface shall be scratched to provide a bond for the brown coat and shall have been in place at least 12 hours before the second or brown coat is applied. The second or brown coat shall be brought out to grounds, and straightened to a true surface and left rough, ready to receive the finish coat.

b. **Lime Plaster.** The first two coats shall be applied in the same manner as gypsum plaster, except that in three-coat work, the second or brown coat shall be applied over a dry base coat.

c. **Portland Cement Plaster.** The first two coats shall be as required for the first two coats of exterior work, except that the interval between the first and second coats shall be not less than 24 hours.

a. **Smooth White Finish.** Shall be applied over base coat which has set and is surface-dry. Thickness shall be from one-sixteenth ($1/16$ "") to one-eighth inch ($1/8$ "").

b. **Sand-Float Finish.** Shall be applied over set base coat which is not quite dry.

c. **Keene's Cement Finish.** Shall be applied over set base coat which is not quite dry. Thickness shall be from one-sixteenth inch ($1/16$ "") to one-eighth ($1/8$) inch, unless finish coat is marked off or jointed, in which case the thickness may be increased as required by depth of marking or jointing.

d. **The Finish Coat.** For interior portland cement plastering, the finish coat shall be applied in the same manner as required for the third coat of exterior stucco, except that other types of finish coat may be applied as specified in Section 714.07.

Monolithic concrete surfaces shall be clean, free from

efflorescence, damp and sufficiently rough to insure adequate bond.

Gypsum plaster applied to monolithic concrete ceilings shall be specially prepared bond plaster for use on concrete, to which water only shall be added. Gypsum plaster on monolithic walls and columns shall be applied over a scratch coat or bond plaster before it has set. The brown coat shall be brought out to grounds, straightened to a true surface and left rough, ready to receive finish coat.

Lime plaster applied to concrete walls shall be as specified in Section 714.07.

Portland cement plaster applied to interior concrete walls or ceilings shall conform to requirements for application to exterior concrete walls as specified in Section 714.11.

714.09—Interior Plastering: Staff

Staff shall be soaked before sticking. Lugs shall be of pure fiber and plaster of paris. Rust-resistive fastenings of sufficient strength to anchor the staff to the support shall be not less than No. 14 B & S gauge copper wire.

714.10—Exterior Plastering: Backing

Except in back plastered construction studs shall be sheathed of wire of not less than No. 18 W & M gauge shall be stretched taut horizontally at intervals not exceeding six inches (6") on centers vertically and securely fastened in place.

Weather protection shall be as specified in Section 714.05.

Exterior plaster, except when applied to concrete or masonry, shall be reinforced with one of the materials having a rust-resistive coating applied after fabrication as set forth in Table No. 714-E.

Table No. 714-E
Exterior Plaster Reinforcement

Type of Reinforcement	Minimum Dimensions of Openings	Maximum Dimension of Vertical Openings	Minimum W & M Gauge	Minimum Weight lbs./sq. yd.
Expanded metal				1.8
Metal lath				3.0
Woven netting . .	1"	1"	18	1.6
Woven netting . .	1"	1½"	17	1.4
Woven netting . .	1"	2"	16	1.4
Welded netting .	1"	1"	18	1.4

Metal reinforcement shall be furred out from the backing at least one-quarter inch ($\frac{1}{4}$ ") with an approved furring device, and shall be nailed with galvanized nails or approved furring devices driven to at least three-quarters inch ($\frac{3}{4}$ ") penetration which shall be spaced not more than six inches (6") apart vertically and sixteen inches (16") apart horizontally. Metal reinforcement shall be lapped at least one full mesh at all joints. When no sheathing is used, all vertical joints shall be made at the studs and horizontal joints where expanded metal or metal lath is used shall have at least one tie between studs, made with No. 18 W & M gauge galvanized annealed tie wire.

714.11—Exterior Plastering: Application

Exterior cement plaster shall be portland cement plaster meeting the requirements of Table No. 714-F, except when applied over concrete or masonry.

Table No. 714-F
Exterior Portland Cement

Coat	Maximum Volume of Sand per Volume of Cement	Minimum Thickness	Minimum Period Moist Curing	Minimum Interval Before Application of Succeeding Coat
First or scratch	3½	½"①	48 hrs.	7 days
Second or brown	(1st & 2nd coats) 4½		¾"	48 hrs.
Third or finish . .	2②	⅛"		8 days

① Measured from backing to crest of scored plaster.

② Approved prepared finish coats containing not less than $\frac{1}{3}$ by weight of portland cement may be used.

Plasticity agents shall be of approved types and amounts, and if added to portland cement in the manufacturing process, no later additions shall be made.

Except when applied to concrete or masonry, and except as otherwise provided for pneumatically applied plaster, exterior cement plastering materials shall be mixed by machine methods for not less than two minutes, and shall be applied in three coats as set forth in Table No. 714-F.

The first coat shall be forced through all openings in the reinforcement so as solidly to fill all spaces. It shall then be scored horizontally with a scratcher having one-eighth inch ($\frac{1}{8}$ ") clipped teeth and grooves not more than one-half inch ($\frac{1}{2}$ ") deep.

The second coat shall be rodded and water floated, with no variation greater than one-quarter ($\frac{1}{4}$ ") in any direction

under a five-foot (5') straightedge.

The third coat shall not be a brush coat.

The masonry surface on which plaster is to be applied shall be clean, free of efflorescence, damp and sufficiently rough to insure proper bond. Mixtures specified for the second coat in this Section may be applied directly to masonry.

714.12—Pneumatically Placed Plaster

Pneumatically placed cement plaster shall be a mixture of portland cement and sand, mixed dry, conveyed by air through a pipe of flexible tube, hydrated at the nozzle at the end of the conveyor and deposited by air pressure in its final position.

Rebound material may be screened and re-used as sand in an amount not greater than 25 per cent of the total sand in any batch.

Pneumatically placed cement plaster shall consist of a mixture of one part cement to not more than five parts of sand. Plasticity agents may be used as specified in Section 714.11. Except when applied to concrete or masonry, such plaster shall be applied in not less than two coats to a minimum total thickness of seven-eighths inch ($\frac{7}{8}$ "). The first coat shall be rodded as specified in Section 714.11 for the second coat. The curing period and time interval shall be set forth in Table No. 714-F.

CHAPTER 715

ALARM SYSTEMS

715.01—Alarm Systems Required

Alarm systems, in accordance with the following specifications, shall be provided in all buildings where required by the several occupancy sections, and also in all buildings of the following classes subject to the provisions of the occupancy sections applying:

Used as sleeping quarters by twenty or more persons.

Used above or below the street (or ground) floor by forty or more persons.

Used above the second floor or in sub-basements by twenty or more persons.

715.02—Occupancy Uses

If a building is divided by one or more fire walls, each section shall be considered as separate building in applying the foregoing requirements.

Department Stores shall be provided with alarm systems and shall be in accordance with this Chapter.

Factories shall be provided with alarm systems and shall be in accordance with this Chapter.

Hospitals and Institutions shall be provided with alarm systems and shall be in accordance with this Chapter.

Note: Alarm sending stations would be so located as to be readily available in all portions of the premises, to the end that when a fire is discovered by any one who is qualified to send an alarm, he may reach a station from which aid may be summoned without being required to leave the zone of his ordinary activities or to pass out of the sight and hearing of those immediately exposed by or in direct view of the fire. The operation of an alarm sending station should automatically act to summon aid such as is afforded by the concentration to the locality of the source of alarm of all attendants who can properly be spared from their usual wards or areas for the purpose of assisting in the removal of physically helpless occupants and in controlling mentally incompetent occupants. The aid so summoned should also include an adequately manned and equipped municipal fire department, if such a department is so situated as to assure prompt arrival. Otherwise, there should be a correspondingly adequate local or private fire brigade, which will be correspondingly summoned.

715.03—Installation

Alarm systems should be so designed that initial fire alarms will sound only in departmental offices, engine rooms, fire brigade stations and other central locations, with provis-

ions whereby authorized persons may send subsequent signals to sound a general alarm.

Hospitals should be patrolled at regular intervals, the person charged with this responsibility visiting all parts of the premises, including closets, attics, etc., for the purpose of discovering fire in its incipency.

Hotels and Apartments shall be provided with alarm systems and shall be in accordance with this chapter.

Office buildings shall be provided with alarm systems and shall be in accordance with this chapter.

Places of Public Assembly, a fire alarm system conforming to the requirements of this Chapter shall be installed for every place of public assembly having a capacity of 500 or more persons if on a ground floor or of whatever capacity if on other than a ground floor. Theatres equipped with movable scenery shall have alarm sending stations on both sides of the proscenium wall in locations designated or approved by the enforcing authority, and in districts served by municipal fire alarm telegraph systems the signaling devices shall conform to and be connected with such system.

Schools. Every building shall be equipped with a fire alarm system in accordance with this chapter. Code signals indicating where the alarm originates are not recommended for schools.

This chapter does not go into details of construction and arrangement of alarm systems, nor do its requirements extend beyond those necessary for safeguarding occupants from fire and fire-panic hazards.

Note: It is strongly recommended that alarm systems be installed so that in addition to complying with the requirements of this Chapter, they will also comply with the Standards of the National Board of Fire Underwriters for the "Installation, Maintenance and Use of Central Station Protective Signaling Systems for Watchman, Fire Alarm Supervisory Service," and for the "Installation, Maintenance and Use of Proprietary, Auxiliary and Local Systems for Watchman, Fire Alarm and Supervisory Service" as recommended by the National Fire Protective Association, thus affording greater protection to property.

Electrical alarm systems are preferable to mechanical alarm systems where conditions are such as to require more than one sending station, and, usually, where more than one sounding device is required. Mechanical systems are sometimes preferable where but one station is required, particularly where it would be difficult to secure regular and responsible maintenance of an electrical system.

715.04—Supervision and Inspection

System shall be under the supervision of a responsible per-

son who shall cause proper tests to be made at frequent intervals and have general charge of all alterations and additions.

Note: No system is sufficiently automatic or durable to avoid the necessity for periodical inspections and working tests of all its parts. Special importance is placed upon the efficiency and reliability and the methods employed in maintaining and inspecting alarm systems.

Systems shall be tested daily.

All apparatus requiring winding or replenishing shall be rewound or replenished as promptly as possible after each test or alarm, and shall be kept in normal condition for operation.

715.05—Sounding Devices

Required sounding devices shall be used for fire alarm purposes only.

Alarm sounding devices shall be provided of such character and so distributed as to be effectively heard in every room above all other sounds.

Note: Visible alarm devices may be provided, in addition to required sounding devices, but shall not be deemed substitutes therefor except where specifically permitted by occupancy sections.

Alarm sounding devices shall be distinctive in pitch and quality from all other sounding devices.

All alarm sounding devices should be of the same type.

The manner of sounding alarms should be standardized with a view of obtaining uniformity throughout as large a geographical area as practicable, so that persons moving from one locality to another will not be misled and confused by differences in manner of sounding alarms.

Note: This point is of special importance in certain occupancies. For example, pending the time when statewide uniformity in school alarm systems can be attained, uniformity of alarm signals should be strictly enforced in all public and private schools throughout each city and the adjacent suburban territory.

715.06—Alarm Sending Station

Alarm sending stations shall be provided near all main exits and in the natural path of escape from fire, at readily accessible and visible points which are not likely to be obstructed.

Sending stations shall be so located that from any part of the building not more than 200 feet will have to be traversed in order to reach a sending station on the same floor or 100 feet and one flight of stairs to reach a sending station upon another floor located in the natural path of escape from fire.

Such stations shall have illumination as required for principal points of exit ways.

Note: It is recommended that at least one sending station be provided upon each floor.

Where conditions are such as to require but one sounding device for an entire building, the functions of a sounding device and a sending station may be combined in a single mechanism.

The arrangement of sending stations, and the manner of their connection with sounding devices shall be such that there will be no difference between the sounding of actual alarms and drill signals.

The manner of operation of alarm sending stations should be standardized so that persons moving from one locality to another will not be misled or confused by difference.

715.07—Automatic Fire Detection Systems

Connections may be provided between required alarm systems and automatic fire detection systems (including automatic sprinkler systems), provided that the effectiveness and dependability of operation of the alarm systems from the manual sending stations is not thereby impaired.

715.08—Connection to Fire Department

Alarm systems in localities under protection of regularly organized fire departments or private fire brigades should be arranged to cause automatic transmission of alarms directly or through an approval central office to such fire departments or brigades upon operation of any alarm sending station if the area protected by the system is subject to use by 100 or more persons.

Note: When no such connection is provided, it is recommended that a municipal fire alarm box be installed either at the main entrance to the building or at the nearest street corner if plainly visible from the main entrance and not more than 300 ft. distant therefrom.

Automatic fire department connections shall be so arranged as to permit drills to be conducted by those in authority without calling out the fire department, and so that the actuation of any required alarm sending station will surely call such department.

ARTICLE VIII

Fire—Resistive Standards

CHAPTER 801

FIRE RESISTANCE RATINGS FOR MATERIALS AND CONSTRUCTION

801.01—General

Fire protection requirements of this code are based on first-resistance ratings. Such ratings are established in this chapter for various building materials, assemblies and thicknesses. Other materials, thicknesses, assemblies and constructions of necessary strength and durability for the use intended, which have successfully performed under tests made by a recognized laboratory in accordance with the requirements of the "Standard Methods of Fire Tests of Building Construction and Materials" (E119-55) of the American Society for Testing Materials, shall be accepted by the Building Official for specific ratings in lieu of those prescribed in this Chapter of the code. Thicknesses as established in this chapter shall be construed as establishing minimum requirements for fire-resistance only and shall not preclude the application of other requirements of this code where considerations of strength, durability or stability require greater thicknesses.

Where plaster is required or permitted under the regulations set forth in this Article the minimum thickness prescribed for plaster over any plaster base, including all types of lath, is expressed in terms of the thickness measured from the face of the plaster base.

No combustible materials shall enter into the construction of assemblies except as hereinafter provided or otherwise accepted on the basis of the foregoing prescribed tests.

Fire doors, curtains, shutters, windows, or other protection required for openings in fire-resistive walls and partitions shall be in accordance with the requirements of Chapter 708.

Roof coverings shall conform to the requirements prescribed in Article III and in Chapter 704.

801.02—Materials for Fire Protection

Materials prescribed for the fire-resistance ratings assigned in this chapter shall conform with the requirements of this Chapter.

801.03—Concrete

Concrete used for fire-protection shall consist of one part (by volume) portland cement and not more than two parts

of sand and four parts of approved aggregate, not over $\frac{3}{4}$ " diameter, reinforced with wire or metal fabric.

Grade A Concrete is concrete in which the coarse aggregate consists of blast-furnace slag, limestone, calcareous gravel, trap rock, burnt clay or shale, cinders containing not more than 25% of combustible material and not more than 5% of volatile material, and other materials meeting the requirements of this Code and containing not more than 30% of quartz, chert, flint, and similar materials.

Grade B Concrete is concrete in which the coarse aggregate consists of granite, quartzite, siliceous gravel, sandstone, gneiss, cinders containing more than 25% but not more than 40% of combustible material and not more than 5% of volatile material, and other materials meeting the requirements of this code and containing more than 30% of quartz, chert, flint, and similar materials.

801.04—Brickwork

Bonded brickwork shall be laid in portland cement mortar, portland cement-lime mortar, or lime mortar. Clay and shale brick shall conform to the American Society for Testing Materials "Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale)" (ASTM C62-50). Concrete brick shall conform to the American Society for Testing Materials "Standard Specifications for Concrete Building Brick" (ASTM C55-55). Sand-lime brick shall conform to the American Society for Testing Materials "Standard Specifications for Sand-Lime Building Brick" (ASTM C73-51).

801.05—Clay or Shale Tile

Hollow clay or shale tile shall be laid in portland cement mortar, portland cement-lime mortar, lime mortar, or gypsum mortar. Used in non-bearing partitions, and for fireproofing, clay or shale tile shall meet the requirements of the American Society for Testing Materials "Standard Specifications for Structural Clay Non-Load Bearing Tile" (ASTM C56-52). Clay or shale tile used in exterior walls and in all load-bearing walls or load-bearing partitions, shall comply with the requirements of the American Society for Testing Materials "Standard Specifications for Structural Clay Load-Bearing Wall Tile" (ASTM C34-55).

801.06—Gypsum

Gypsum partition tile or blocks shall contain not more than 12½ per cent by weight of binding material, shall be laid in gypsum mortar, and shall meet the requirements of the American Society for Testing Materials "Standard Specifications for Gypsum Partition Tile or Block" (ASTM C52-54).

Poured gypsum used for fireproofing and floor and roof construction shall contain not more than 12½ per cent of

wood chips, shavings or fiber, measured in a dry condition, as a percentage, by weight, of the dry mix. Gypsum mortar shall be composed of one part gypsum and not more than three parts clean, sharp, well-graded sand, by weight.

Fibered plaster may be used where unsanded or neat gypsum plaster is prescribed.

All plaster mixes for sanded gypsum plasters shall be measured by dry weight. Unless otherwise indicated in this Article, when sand is used as an aggregate in gypsum plaster, the proportion of gypsum to sand shall be not leaner than 1-3 by weight.

When vermiculite or perlite is used as an aggregate in plaster, the scratch coat shall be mixed in the proportion of 100 lbs. of gypsum neat plaster to not more than 2 cu. ft. of vermiculite or perlite aggregate and the brown coat shall be mixed in the proportion of 100 lbs. of gypsum neat plaster to not more than 3 cu. ft. of vermiculite or perlite, except as may be otherwise permitted or prescribed in this code.

801.07—Gypsum Lath, Gypsum Wallboard, and Gypsum Sheathing Board

Gypsum lath shall comply with the provisions of the American Society for Testing Materials "Standard Specifications for Gypsum Lath" (ASTM Designation C37-54). Perforated gypsum lath shall have perforations not less than $\frac{3}{4}$ " in diameter, with one perforation for not more than 16 square inches of lath surface.

Gypsum lath shall be nailed to wood studs or joists in all constructions required to be fire-resistive, with No. 13 gauge, $1\frac{1}{8}$ ", 19/64" flat-head blued nails at intervals not exceeding 4" on centers (5 nails per lath per support for 16" wide lath), or equivalent attachment.

Gypsum wallboard shall comply with the provisions of the American Society for Testing Materials "Standard Specifications for Gypsum Wallboard" (ASTM Designation C36-55).

Gypsum sheathing board shall comply with the provisions of the American Society for Testing Materials "Standard Specifications for Gypsum Sheathing Board" (ASTM Designation C79-54).

801.08—Metal or Wire Lath

Wherever metal lath or wire lath and plaster are used as required protection against the spread of fire, the weight of metal lath shall be not less than 2.5 lbs. per square yard when used in vertical position, and not less than 2.75 lbs. per square yard when used in horizontal position and wire lath shall be not lighter than No. 19 gauge wire, $2\frac{1}{2}$ meshes per inch, or equivalent.

Weight tags shall be left on all metal lath or wire lath until inspected and approved by the Building Official.

Metal lath for ceilings below wood joists in construction which is required to be fire-resistive shall be attached with 1½", 11 gauge, 7/16" head barbed roofing nails spaced at intervals not to exceed 6" on centers, or equivalent attachment.

Paper-backed wire fabric and plaster may be used as required protection against spread of fire as prescribed and permitted elsewhere in this Chapter. Wherever so used, such paper-backed wire fabric shall be not lighter than No. 16 gauge wire, with mesh not to exceed 2"x2".

801.09—Concrete Blocks

Hollow load-bearing and non-load-bearing concrete masonry units shall conform to the requirements of the following American Society for Testing Materials Specifications:

Standard Specifications for Hollow

Load-Bearing Concrete Masonry UnitsC90-52

Standard Specifications for Hollow

Non-Load-Bearing Concrete Masonry UnitsC129-52

801.10—Vermiculite

Vermiculite, when used as an aggregate with plaster, shall conform in particle size to the American Society for Testing Materials "Tentative Specifications for Inorganic Aggregates for Gypsum Plaster" (ASTM C35-57T). The weight of vermiculite shall be not less than 6 nor more than 10 lbs. per cu. ft., as determined by measurement in a cubic-foot box, using the shoveling procedure as outlined in the American Society for Testing Materials "Tentative Method of Test for Unit Weight of Aggregate" (ASTM C29-55T).

801.11—Perlite

Perlite, when used as an aggregate with plaster, shall conform in particle size to the American Society for Testing Materials "Tentative Specifications for Inorganic Aggregates for Gypsum Plaster" (ASTM C35-57T). The weight of perlite shall be not less than 7½ nor more than 15 lbs. per cu. ft., as determined by measurement in a cubic-foot box, using the shoveling procedure as outlined in the American Society for Testing Materials "Tentative Method of Test for Unit Weight of Aggregate" (ASTM C29-55T).

CHAPTER 802

FIRE—RESISTANCE RATINGS FOR
NON-LOAD-BEARING WALLS AND PARTITIONS

802.01—General

The fire-resistance of non-load-bearing walls and partitions shall be rated in accordance with this Chapter and Tables No. 802-A and 802-B, except as provided in Chapter 801.

Table No. 802-A

Fire Resistance Ratings

Non-Load-Bearing Masonry Walls and Partitions

Wall or Partition Assembly	Minimum Wall or Partition Thickness inches	Fire Resistance Ratings hours
Brick Walls		
1—Solid		
a—Clay, shale, concrete or sandlime—unplastered	4	1-hr
b—Clay, shale, concrete or sandlime—plastered $\frac{1}{2}$ " sanded gypsum plaster (mix 1-3) on each side	4	2-hr
Monolithic Concrete Walls		
1—Plain Concrete Solid Walls-		
a—Unplastered	5½ 4	2-hr 1-hr
2—Reinforced Concrete Walls-		
a—Unplastered-		
Grade A aggregate (b)	5 3½	2-hr 1-hr
Grade B aggregate (b)	5½ 4	2-hr 1-hr
b—Plastered—each side $\frac{3}{4}$ " portland cement stucco, or portland cement or gypsum plaster-		
Grade A aggregate (b)	5 4 3	4-hr 3-hr 2-hr
Grade B aggregate (b)	5 4 3	3-hr 2-hr 1-hr
Hollow Concrete Masonry Units (a)		
1—Aggregates—volcanic pumice, expanded slag, aircooled slag, burned clay or shale		

Table No. 802-A, cont.

Wall or Partition Assembly	Thickness inches	FRR hours
a—Unplastered	4/1	1-hr
volcanic pumice	4/1	2-hr
b—Plastered—on one side	4/1 ^{5/16}	2-hr
	3/1	1-hr
c—Plastered—on each side	4/1 ^{5/16}	3-hr
	3/1	2-hr
2—Other aggregates		
a—Unplastered	4/1	1-hr
b—Plastered—on one side	4/1 ^{5/16}	2-hr
	3/1	1-hr
c—Plastered—on each side	4/1	2-hr

Reference Notes—Table No. 802-A

- (a) The pair of figures listed in the minimum thickness column (4/1^{5/16}) applied to hollow concrete masonry units refer to: first, minimum thickness of the wall and, second, minimum thickness of the face shell of the unit, both in inches.
- (b) For definition of Grade A concrete or Grade B concrete refer to Section 801.03.

Table No. 802-B

Fire Resistance Ratings
Non-Load-Bearing Walls and Partitions

Wall or Partition Assembly	Minimum Wall or Partition Thickness inches	Fire Resistance Ratings hours
Solid Plaster Partitions		
1—Solid Plaster Steel Framed Partitions		
a—Plaster applied to metal lath, except as noted, supported on 3/4" steel channel studs		
Unsanded gypsum plaster	2½	2½-hr
	2	2-hr
Vermiculite-gypsum or perlite-gypsum plaster	2½	2-hr
	2	1-hr
Sanded Gypsum plaster		
(mix 1-½)	2	1½-hr
(mix 1-2)	2	1-hr
Sanded gypsum plaster		

Table No. 802-B, cont.

Wall or Partition Assembly	Thickness inches	FRR hours
(mix 1-2, 1-3) on metal lath or paper-backed wire fabric	2½	1-hr
2—Solid Plaster Studless Partitions		
a—Plaster applied to each side of ½" long-length plain gypsum lath inserted at top and bottom in steel or other non-combustible runners		
1" vermiculite-gypsum or perlite-gypsum plaster	2½	2-hr
¾" vermiculite-gypsum or perlite-gypsum plaster	2	1-hr
b—Plaster applied to each side of diamond mesh or rib metal lath fastened top and bottom in steel or other non-combustible runners		
Sanded gypsum plaster (mix 1-2)	2	1-hr
c—Plaster applied to each side of ⅜" or ½" long-length plain gypsum lath inserted at top and bottom in steel or other non-combustible runners		
13/16" sanded gypsum plaster (mix 1-1, 1-2)	2	1-hr
Hollow Steel Framed Partitions		
1—Steel Stud Hollow Partitions		
a—Steel studs with plaster applied to both faces on metal lath with not less than 2" air-space between inside faces of lath		
Plaster—each face		
⅞" unsanded gypsum plaster		2½-hr
⅞" vermiculite-gypsum or perlite-gypsum plaster		2-hr
¾" unsanded gypsum or ⅞" sanded gypsum (mix 1-½)		2-hr
¾" sanded gypsum (mix 1-½) or ⅝" unsanded gypsum		1½-hr
⅝" sanded gypsum (mix 1-2)		1-hr
¾" sanded gypsum (mix 1-2, 1-3)		1-hr
¾" sanded portland cement-asbestos fibre plaster (mix 1-2, 1-3, 3 lbs. asbestos fibre per		

Table No. 802-B, cont.

Wall or Partition Assembly	Thickness inches	FRR hours
bag of cement)		1-hr
b—Steel studs with plaster applied to both faces on $\frac{3}{8}$ " perforated gypsum lath, with the lath fastened to studs by approved wire clips supporting the lath fully across its face, and with not less than 2" air-space between inside faces of lath Plaster—each face $\frac{1}{2}$ " vermiculite-gypsum or perlite-gypsum (mix $2\frac{1}{2}$ cu. ft. aggregate per 100 lbs. of gypsum)		1-hr
$\frac{1}{2}$ " sanded gypsum (mix 1-2)		1-hr
Masonry Walls and Partitions		
1—Hollow Structural Clay Tile Partitions		
One cell in wall thickness, except as noted.		
a—Shale tile or dense hard-burned clay tile		
Unplastered-		
Units not less than 40% solid(b)	4	1-hr
Units not less than 30% solid(b)	6	2-hr
Plastered— $\frac{5}{8}$ " sanded gypsum plaster (mix 1-3) on each side-		
Units not less than 50% solid	4(a)	1-hr
Units not less than 30% solid	6(a)	1-hr
Units not less than 40% solid(b)	4(a)	2-hr
Units not less than 30% solid(b)	6(a)	3-hr
b—Medium-burned clay tile		
Unplastered-		
Units not less than 45% solid-two cells in wall thickness	6	1-hr
Units not less than 30% solid(b)	6	2-hr
Plastered— $\frac{5}{8}$ " sanded gypsum plaster (mix 1-3) on each side-		
Units not less 50% solid	3(a)	1-hr

Table No. 802-B, cont.

Wall or Partition Assembly	Thickness inches	FRR hours
Units not less 30% solid	6(a)	1-hr
Units not less than 60% solid—two cells in wall thickness	4(a)	2-hr
Units not less than 30% solid (b)	6(a)	3-hr
2—Gypsum Block Partitions		
a—Solid Block		
Unplastered—		
Units not less than 100% solid	2	1-hr
	3	3-hr
	5	4-hr
b—Hollow Block		
Unplastered—		
Units not less than 70% solid	3	1-hr
Plastered— $\frac{1}{2}$ " sanded gypsum plaster (mix 1-3) on either side—		
Units not less than 70% solid	4(a)	3-hr
Plastered— $\frac{1}{2}$ " sanded gypsum plaster (mix 1-3) on each side		
Units not less than 70% solid	3(a)	3-hr
	4(a)	4-hr
3—Perlite Concrete Masonry Walls		
a—Hollow perlite concrete masonry units with cores filled with perlite concrete mortar		
Unplastered—	4	4-hr
b—Light-weight Concrete Panel or Curtain Wall		
a—Exterior section: 4" perlite- portland cement concrete applied on paper-backed wire fabric encasing steel framing members		
Interior section: channel furred section of a 1" air-space and 1" perlite-gypsum plaster applied on paper-backed wire fabric—	6(c)	4-hr
b—Vermiculite-portland cement con- crete applied to paper-backed wire fabric spaced $1\frac{1}{2}$" from $1\frac{1}{2} \times 1\frac{1}{2}$" steel channels, 2" on centers, with concrete encasing channels—	4	4-hr

Reference Notes—Table No. 802-B.

- (a) Thickness of partition not including plaster.
- (b) Cells filled with broken tile, stone, slag, cinders or sand mixed with mortar.
- (c) Total thickness of partition including plaster.

CHAPTER 803

FIRE RESISTANCE RATINGS FOR LOAD-BEARING WALLS AND PARTITIONS

803.01—General

The fire-resistance of load-bearing walls and partitions shall be rated in accordance with this Chapter and Tables No. 803-A and 803-B except as provided in Chapter 801.

Where higher fire-resistance ratings are indicated in Tables No. 802-A and 802-B and Tables No. 803-A and 803-B because of the addition of plaster, the higher rating applies only when the plastered face is exposed to the fire.

803.03—Plaster

Plaster, when applied to masonry, or gypsum lath shall be not less than $\frac{1}{2}$ inch in thickness. Thickness shall be measured from the face of the plaster base.

Gypsum plaster as required for the fire-resistance ratings indicated in Article VIII may be fibered or unfibered.

803.04—Thickness of Walls

The thickness prescribed in Tables No. 802-A and 802-B and Tables No. 803-A and 803-B for masonry and tile walls and partitions of the various fire-resistance ratings do not include the thickness of plaster, except as specifically noted.

803.05—Mortar

For the fire-resistance ratings indicated in Tables No. 802-A, 802-B, 803-A and 803-B, masonry walls shall be laid in portland cement-lime mortar, or portland cement mortar, provided that gypsum blocks shall be laid in gypsum mortar only. Hollow structural clay tile partitions also may be laid in gypsum mortar. Mix of portland cement-lime mortar shall be not leaner than 1:1:6 (by volume) for all brick walls and for all concrete masonry units, except that solid brick walls 8" and over in thickness may be laid in 1:3 (by volume) portland cement or lime mortar. Mix of portland cement-lime mortar for structural clay tile walls and partitions shall be not leaner than 1:1:6 mix (by volume). Mix of gypsum mortar shall be not leaner than 1:3 (by weight).

803.06—Closure of Ends

All open cells in tile or block occurring at wall ends shall be filled solid with concrete or gypsum for at least a depth of 6 inches, or solid units or closure tile set in the opposite direction shall be used. No fire-wall of hollow units and no 8 inch solid wall shall be broken into, subsequent to erection, for chases or for the insertion of structural members.

803.07—Maximum Allowable Heights of Partitions

All masonry, tile, or block load-bearing partitions re-

quired to have a specific fire-resistance rating by the provisions of this code shall be limited in height not to exceed thirty times their thickness, except when securely anchored at top and bottom, and except where fire-resistance, ratings for such partitions of greater height than herein specified have been established by actual fire tests conforming with the requirements of Chapter 801. For height of non-bearing partitions of masonry, see Section 601.06 and Chapter 701. Two-inch solid, studless partitions of gypsum plaster on metal lath or gypsum lath shall not exceed 12 ft. in height.

803.08—Firestopping

Hollow partitions shall be firestopped with non-combustible materials at every floor.

803.09—Lath

Metal or wire lath used in fire-resistant walls or partitions shall meet the requirements of Section 801.08. Gypsum lath, gypsum wallboard, and gypsum sheathing board used in fire-resistant walls or partitions shall meet the requirements of Section 801.07.

803.10—Combustible Members Framing Into Walls

When combustible members are framed into hollow masonry walls which are filled solidly with masonry, concrete, or equivalent fire-resistive material to a depth of not less than 4 inches, the rating will be the same as for non-combustible or no members framed into the wall except that the rating shall not exceed the rating for solid walls of the same thickness with combustible members framed into the wall. As applied to hollow structural tile walls, see Reference Note (g) to Tables No. 803-A and 803-B.

For plaster on the same side as combustible framing, and for plaster on one side of walls or partitions which support combustible members from both sides, the fire-resistance rating for such walls or partitions shall be the same as the rating for the same walls unplastered.

Table No. 803-A
Fire Resistance Ratings
Load-Bearing Masonry Walls and Partitions

Wall or Partition Assembly	Minimum Nominal Thickness inches		Fire Resistance Ratings hours
	Members Framed into Wall or Partition		
	Combustible	None or Non-Combustible	
Brick Walls			
1—Solid			
a—Clay, shale, concrete or sandlime—unplastered	12 8	8	4-hr 2-hr
b—Clay, shale, concrete or sandlime—½" sanded gypsum plaster (mix 1-3) on one side	12(a) 12(b) 8(a)	8	4-hr 3-hr
c—Clay, shale, concrete or sandlime—½" sanded gypsum plaster (mix 1-3) on each side	12 12(b) 8(b) 8	8	4-hr 3-hr 2-hr
2—Hollow Cavity Type			
a—Clay or shale—unplastered or ½" sanded gypsum plaster (mix 1-3) on each side, ¼" metal ties for each 3 sq. ft. of wall area	9(c) 9	9	4-hr 2-hr 1-hr
b—Hollow Rolok, clay or shale—unplastered	12 8	12 8	4-hr 3-hr 2-hr 1-hr
c—Hollow Rolok, clay or shale—½" sanded gypsum plaster (mix 1-3) on one side	12 8	8	4-hr 3-hr 1-hr
d—Hollow Rolok, clay or shale—½" sanded gypsum plaster (mix 1-3) on each side		8	4-hr

Table No. 803-A, cont.

Wall or Partition Assembly	Framed Members inches		FRR hours
	Comb	Non-Comb	
e—Hollow Rolok Bak, clay or shale—unplastered		8	4-hr
Monolithic Concrete Walls			
1—Plain concrete solid walls			
a—Unplastered	(e)	7½ 6½ 5½	4-hr 3-hr 2-hr
2—Reinforced Concrete			
a—Solid walls, concrete coarse aggregate, grade A ^(d) —unplastered	(e)	6½ 6 5 3½	4-hr 3-hr 2-hr 1-hr
b—Solid walls, concrete coarse aggregate, grade B ^(d) —unplastered	(e)	7½ 6½ 5½	4-hr 3-hr 2-hr
c—Solid walls, concrete coarse aggregate, grade A ^(d) —plastered on both sides with ¾" portland cement stucco or portland cement or gypsum plaster	(e)	5 4	4-hr 3-hr
d—Solid walls, concrete coarse aggregate, grade B ^(d) —plastered on both sides with ¾" portland cement stucco or portland cement or gypsum plaster	(e)	6 5 4	4-hr 3-hr 2-hr

Table No. 803-A, cont.

Wall or Partition Assembly	Framed Members inches		FRR hours
	Comb	Non-Comb	
Structural Tile Walls and Partitions			
1—Hollow Structural Tile Walls, clay or shale			
a—Unplastered			
	16(f-g)	12(k)	4-hr
	16(h)	12(l)	
	12(g)	8(l)	3-hr
	12(g-i)	12(o)	
		8(o)	2-hr
	8(g)	8(n)	
	12(j)		1-hr
b—Plastered, 5/8" sanded gypsum plaster (mix 1-3) on one side (Rating—combustible application only if fire-exposure is on side opposite to that into which members frame and if that side is plastered)			
	16(g-h)	12(l)	4-hr
		8(l)	
		12(o)	
	12(g-i)	8(o)	3-hr
	12(m)		
	8(g)	8(p)	2-hr
	8(g-n)		1-hr
c—Plastered, 5/8" sanded gypsum plaster (mix 1-3) on each side			
	16(g-h)	12(o)	4-hr
	12(g-i)	8(n)	3-hr
	12(m)		
	8(g)		2-hr
	8(g-n)		1-hr
Structural Tile-Brick Faced Walls			
1—Hollow Structural Tile, clay or shale, Brick-Faced Walls with Tile bonded to 4" Brick Facing			
a—Unplastered—total masonry thickness			
	12(q)	12(q)	4-hr
	8(r)	8(r)	3-hr
			2-hr
			1-hr

Table No. 803-A, cont.

Wall or Partition Assembly	Framed Members inches		FRR hours
	Comb	Non-Comb	
b—Plastered— $\frac{5}{8}$ " sanded gypsum plaster (mix 1-3) on tile side total masonry thickness	16(s) 12(a) 8(r)	8(r)	4-hr 3-hr 2-hr 1-hr
Stone Masonry Walls			
1—Solid Walls			
a—Plastered or unplastered	(e)	12 8	4-hr 1-hr
Hollow Concrete Masonry Units^(t)			
1—Aggregates—volcanic pumice, expanded slag, air-cooled slag, or burned clay of shale			
a—Unplastered		6/2 8/1½ (u) 8/1½ 8/1¼ 6/1¾	4-hr 3-hr 2-hr
b—Plastered—on one side		8/1¼ 6/1¾ 6/1½	3-hr 2-hr
c—Plastered—on each side		6/1¾	3-hr
2—Other Aggregates			
a—Unplastered		12/1¾ 8/2¼ 8/1¾ 6/2 8/1¾	4-hr 3-hr 2-hr
b—Plastered—on one side			

Table No. 803-A, cont.

Wall or Partition Assembly	Framed Members inches		FRR hours
	Comb	Non-Comb	
Plastered—on each side		8/1 $\frac{3}{4}$	
		6/2	4-hr
		8/1 $\frac{3}{8}$	3-hr

Reference:

Note 1: Where hollow spaces or cells of hollow masonry units surrounding the ends of combustible framing members are filled solidly with masonry the ratings will be the same as for non-combustible or no members framed into the wall; except, the rating shall not exceed the rating for solid walls of the same thickness with combustible framing.

Table No. 803-B
Fire Resistance Ratings
Load-Bearing Walls and Partitions

Wall or Partition Assembly	Fire Resistance Ratings hours
Steel-Framed Brick-Veneered Walls	
1—Steel studs faced outer side with $\frac{1}{2}$ " wood fiber-board sheathing next to studs, $\frac{3}{4}$ " air-space formed with $\frac{3}{4}$ "x1 $\frac{5}{8}$ " wood strips placed over the fiber-board and secured to the studs; paper-backed wire fabric nailed to such strips, 3 $\frac{3}{4}$ " brick veneer held in place by filling $\frac{3}{4}$ " space between the brick and paper-backed fabric with mortar. Inside facing of studs: $\frac{5}{8}$ " unsanded gypsum plaster over face of metal lath attached to $\frac{5}{16}$ " wood strips secured to the edges of the studs. Plaster Side Exposed Brick-Faced Side Exposed	1 $\frac{1}{2}$ -hr 4-hr
2—Steel studs faced outer side with 1" magnesium oxysulfate wood fiber-board sheathing attached to studs, 1" air-space, and 3 $\frac{3}{4}$ " brick veneer attached to steel frame with metal ties every fifth course. Inside facing of studs: $\frac{3}{4}$ " sanded gypsum plaster (mix 1-2)	

Table No. 803-B, cont.

Wall or Partition Assembly	FRR hours
<p>applied over face of metal lath attached directly to the studs.</p> <p>Plaster Side Exposed Brick-Faced Side Exposed</p>	<p>1½-hr 4-hr</p>
<p>3—Steel studs faced outer side with 1" magnesium oxysulfate wood fiber-board sheathing attached to studs, 1" air-space, and 3¾" brick veneer attached to steel frame with metal ties every fifth course. Inside facing of studs: ¾" vermiculite-gypsum or perlite-plaster or ⅞" sanded gypsum plaster (mix 1-2) applied over face of metal lath attached directly to the studs.</p> <p>Plaster Side Exposed Brick-Faced Side Exposed</p>	<p>2-hr 4-hr</p>
<p>4—Steel studs faced outer side with ½" gypsum sheathing board attached to studs, and 3¾" brick veneer attached to the steel frame with metal ties every fifth course. Inside facing of studs: ½" sanded gypsum plaster (mix 1-2) applied on ½" perforated gypsum lath securely attached to the studs and having strips of metal lath 3" wide applied to all horizontal joints of gypsum lath.</p> <p>Plaster Side Exposed Brick-Faced Side Exposed</p>	<p>2-hr 4-hr</p>
<p>5—Steel studs faced outer side with paper-backed wire fabric attached to the studs, and 3¾" brick veneer held in place by filling 1" space between the brick and the lath with mortar. Inside facing of studs: 1" paper-enclosed mineral-wool blanket weighing 0.6 lbs. per sq. ft. or approved equivalent, attached to the studs; metal lath or paper-backed wire fabric laid over the blanket and attached to the studs, and ⅝" sanded gypsum plaster over face of lath (mix 1-2 scratch coat, 1-3 brown coat).</p> <p>Plaster Side Exposed Brick-Faced Side Exposed</p>	<p>4-hr 5-hr</p>

Table No. 803-B, cont.

Wall or Partition Assembly	FRR hours
Wood-Framed Walls and Partitions	
1—Wood framed Plaster and Wallboard Partitions	
a—Metal or wire lath (except as noted) and plaster on both sides of 2"x4" (or larger) wood stud framing, effectively fire-stopped.	
$\frac{5}{8}$ " sanded gypsum plaster (mix 1-2, 1-3) or $\frac{3}{4}$ " sanded gypsum plaster (mix 1-2, 1-3) on metal lath or paper-backed wire fabric.	1-hr
$\frac{5}{8}$ " vermiculite-gypsum or perlite-gypsum plaster on metal lath.	1-hr
$\frac{3}{4}$ " sanded portland cement plaster (mix 1-2, 1-3 with 3 lbs. of short asbestos fiber per bag of cement) on metal or wire lath.	1-hr
b—Gypsum lath and plaster on both sides of 2"x4" (or larger) wood stud framing, effectively fire-stopped.	
$\frac{1}{2}$ " sanded gypsum plaster (mix 1-2) applied to $\frac{3}{8}$ " perforated gypsum lath.	1-hr
$\frac{1}{2}$ " vermiculite-gypsum or perlite-gypsum plaster applied to $\frac{3}{8}$ " perforated gypsum lath.	1-hr
c—Gypsum wallboard on both sides of 2"x4" (or larger) wood stud framing, effectively fire-stopped.	
Two layers of $\frac{3}{8}$ " or $\frac{1}{2}$ " gypsum wallboard attached to both sides of wood studs.	1-hr
One layer of $\frac{1}{2}$ " gypsum wallboard attached to both sides of wood studs, with stud spaces filled with mineral wool insulation bats nailed in place to the studs.	1-hr
d—Approved gypsum wallboard or coreboard with a specially formulated core which provides greater fire-resistance than regular wallboard or coreboard of the same thickness, on both sides of 2"x4" (or larger) wood stud framing, effectively fire-stopped.	

Table No. 803-B, cont.

Wall or Partition Assembly	FRR hours
One layer $\frac{5}{8}$ " gypsum wallboard attached to both sides of wood studs.	1-hr
Two layers $\frac{5}{8}$ " gypsum wallboard attached to both sides of wood studs.	2-hr
2—Wood Framed Exterior Walls	
a—Wood studs 2"x4" (or larger), effectively fire-stopped; outer face gypsum sheathing board and wood siding; inner face gypsum plaster on gypsum lath. Wood siding on $\frac{1}{2}$ " gypsum sheathing board attached to outer face of wood studs; $\frac{1}{2}$ " sanded gypsum plaster (mix 1-2) on $\frac{3}{8}$ " perforated gypsum lath on inner face of studs; rating for outside fire-exposure.	1-hr
Hollow Steel-Framed Partitions	
1—Steel Stud Hollow Partitions	
a—Steel studs to both faces of which is attached plaster applied over face of metal lath, with not less than 2" airspace between inside faces of lath. Plastered—each face $\frac{7}{8}$ " unsanded gypsum plaster $\frac{5}{8}$ " unsanded gypsum plaster $\frac{5}{8}$ " sanded gypsum plaster (mix 1-2, 1-3)	2-hr 1½-hr 1-hr
b—Steel studs to both faces of which is attached plaster applied to $\frac{3}{8}$" perforated gypsum lath with not less than 2" air space between inside faces of lath. Plastered—each face $\frac{5}{8}$ " unsanded gypsum plaster	1-hr

Reference Notes to Tables No. 803-A and 803-B—Fire Resistance Ratings for Load-Bearing Walls and Partitions

- (a) Rating is applicable only when the plastered side of wall or partition is exposed to fire.
- (b) 8" for sand-lime or concrete brick or 12" for clay or shale brick (3-hr. rating).
- (c) A 9" wall may be used for a 2-hr. rating if hollow spaces near combustible members are filled with fire-resistive material for the full thickness of the wall and for at least 4" above and below, and between the combustible members.
- (d) Grade A and Grade B concrete shall comply with the requirements in Section 801.03.
- (e) For combustible members framing into wall, the wall shall be of such thickness that the thickness of solid material between the end of each member and the opposite face of the wall, or between members framing in from opposite sides, will not be less than 93% of the thickness shown in the table for "None or Non-Combustible" members framed into wall.
- (f) Two or three units, four or five cells in wall thickness. Units not less than 40% solid.
- (g) The ratings for tile walls with combustible members projecting into the walls may be increased to those given for similar walls with non-combustible members if the spaces surrounding the ends of the members are filled solidly with mortar or masonry, but in no case may it exceed 2-hours for 8" unplastered walls or 2½-hours for 8" plastered walls.
- (h) 16" hollow tile (two units, four cells in wall thickness); or 12" hollow tile (one unit, three cells in wall thickness, units not less than 49% solid).
- (i) One unit, three cells in wall thickness. Unit not less than 40% solid.
- (j) 12" hollow tile, three cells in wall thickness (8" tile if hollow spaces are filled as required in Reference Note (3) herein); or 8" hollow tile (one unit, two cells in wall thickness, units not less than 46% solid).
- (k) Two units, three or four cells in wall thickness. Units not less than 45% solid.
- (l) 12" hollow tile (two units, three cells in wall thickness); or 8" hollow tile (one unit, three or four cells in wall thickness, units not less than 53% solid).
- (m) 12" hollow tile, two cells in wall thickness (8" tile if hollow spaces are filled as required in Reference Note (3) herein); or 8" hollow tile (one unit, two cells in wall thickness, units not less than 49% solid).

- (n) One unit, two cells in wall thickness. Unit not less than 40% solid.
- (o) 12" hollow tile (three cells in wall thickness); or 8" hollow tile (one unit, two cells in wall thickness, units not less than 49% solid).
- (p) 8" hollow tile (three cells in wall thickness); or 8" hollow tile (one unit, two cells in wall thickness, units not less than 40% solid).
- (q) 8" (40% solid) tile plus 4" brick face. Ratings apply when tile side of wall is exposed to fire.
- (r) 4" (40% solid) tile plus 4" brick face. Ratings apply when tile side of wall is exposed to fire.
- (s) 12" (40% solid) tile plus 4" brick face.
- (t) Applicable to Hollow Concrete Masonry Units, in each pair of numbers listed in the table, the first number is the minimum thickness of wall and the second number is the minimum thickness of the face shell, expressed in inches in each case.
- (u) 8" hollow concrete masonry units with $1\frac{1}{2}$ " thickness of face shell must be plastered on one side for burned clay or shale aggregate, for the 4-hr. rating.
- (v) This construction not acceptable for use where a 2-hr. construction is required to be of non-combustible materials.

CHAPTER 804
FIRE RESISTANCE RATINGS FOR
PROTECTED STEEL COLUMNS

804.01—General

The fire-resistance of protected steel columns shall be rated in accordance with this Chapter and Table No. 804-A for the types of protection indicated, except as otherwise provided in Chapter 801. See also the General Requirements which follow Table No. 804-A.

804.02—Fire Resistance Ratings For Steel Columns Partly Protected With Concrete

Steel columns of solid section (not latticed) unprotected outside, but having re-entrant space filled with Grade A Concrete and having minimum area of solid materials not less than 64 sq. inches, shall have their fire-resistance rated at 1 hour.

804.03—General Requirements—First Resistance Ratings For Protected Steel Columns Table

The thickness in Table No. 804-A refer to thicknesses of protective material before the application of plaster except that the thickness indicated for plaster protection is total plaster thickness. Thicknesses shall be measured from the extreme outer edge of the member, except that the thickness of protective material required at the extreme edges of lugs, brackets, wind bracing and other connections shall be not less than 1 inch.

804.04—Reinforcement

Except as otherwise prescribed in Table No. 804-A, poured protection shall be adequately reinforced with not less than 4"x4" wire mesh weighing not less than 1½ lbs. per square yard, or equivalent reinforcement.

804.05—Mortar Joints

Protective coverings that consist of masonry units shall be solidly bedded and laid in portland cement or portland cement-lime mortar, except that gypsum blocks shall be laid in gypsum mortar; structural clay tile units may likewise be laid in gypsum mortar.

804.06—Bonds and Ties

Except as otherwise prescribed in Table No. 804-A, block and tile protective coverings shall be securely anchored or bonded by wall ties or metal mesh laid in the horizontal joints, by metal clips connecting one unit to another, by outside tie wires not smaller than No. 12 B & S gauge (0.08" diameter) with at least one such tie around every course, or by means of specially designed units providing positive anchorage to

the member or to other units. Outside tie wires shall in all cases be protected by at least $\frac{1}{2}$ -inch of mortar or plaster.

804.07—Plaster Thickness

Except as otherwise prescribed in Table No. 804-A, wherever plaster is required therein to be applied to masonry, or gypsum lath, gypsum plaster not less than $\frac{1}{2}$ -inch thick shall be used. Thickness of plaster shall be measured from the face of the plaster base.

804.08—Metal or Wire Lath

Where metal lath or wire lath are prescribed in Table No. 804-A, they shall meet the minimum requirements of Section 801.08 of this code.

804.09—Gypsum Lath

Where gypsum lath is prescribed in Table No. 804-A, it shall meet the minimum requirements of Section 801.07 of this code.

Table No. 804-A
Fire Resistance Ratings
Protected Steel Columns

Protective Material	Minimum Thickness of Protective Material inches	Fire Resistance Ratings hours
Concrete—re-entrant space filled solid		
a—Grade A concrete ^(r) , coarse aggregate other than trap rock, and, except that it shall have a combined total of not more than 10 per cent of quartz, chert or flint.		
Columns—6"x6"	2	4-hr
	1½	3-hr
	1	2-hr
—8"x8"	1½	4-hr
	1	3-hr
—12"x12" or larger	1	4-hr
b—Trap rock coarse aggregate or Grade A concrete ^(r) with coarse aggregate having a combined total of from 10 to 30 per cent of quartz, chert or flint, with wire ties as prescribed in reference ^(c) ; or cinder, sandstone or granite aggregate of Grade B		

Table No. 804-A, cont.

Protective Material	Thickness inches	FRR hours
concrete ^(r) if concrete is held in place as provided in reference ^(d) . Columns—6"x6"	2½	4-hr
	2	3-hr
	1½	2-hr
	1	1-hr
—8"x8"	2	4-hr
	1½	3-hr
	1	2-hr
—12"x12" or larger	1½	4-hr
	1	3-hr
c—Cinder, sandstone or granite aggregate of Grade B concrete ^(r) with wire ties as prescribed in reference ^(c) ; or siliceous aggregate of Grade B concrete ^(r) having a combined total of 60 per cent or more of quartz, chert or flint if concrete is held in place as prescribed in reference ^(d) . Columns—6"x6"	3	4-hr
	2	3-hr
	1	1-hr
—8"x8"	3	4-hr
	2	3-hr
	1½	2-hr
	1	1-hr
—12"x12" or larger	2	4-hr
	1½	3-hr
	1	2-hr
d—Siliceous aggregate of Grade B concrete ^(r) having a combined total of 60 per cent or more of quartz, chert or flint with wire ties as prescribed in reference ^(c) . Columns—6"x6"	4½	4-hr
	3½	3-hr
	2½	2-hr
	1½	1-hr
—8"x8"	4	4-hr
	3	3-hr
	2	2-hr
	1	1-hr

Table No. 804-A, cont.

Protective Material	Thickness inches	FRR hours
—12"x12" or larger	3	4-hr
	2	3-hr
	1½	2-hr
	1	1-hr
Hollow Clay or Shale Tile(e)		
a—Unplastered	(f)	4-hr
	2(g)	3-hr
	2(h)	1-hr
b—Plastered—¾" sanded gypsum plaster (mix 1-3 by volume)	2(i)	4-hr
Gypsum		
1—Poured solid(e), re-entrant space filled and reinforced with 4"x4" wire mesh reinforcement wrapped around column		
a—Unplastered	2	4-hr
	1½	3-hr
	1	2-hr
2—Solid Block(e)		
a—Unplastered	4(j)	4-hr
	2(k)	2-hr
b—Plastered—½" sanded gypsum plaster	2(m)	4-hr
3—Hollow Block(e)		
a—Unplastered	3(n)	2-hr
b—Plastered—½" sanded gypsum plaster	3(o)	4-hr
Cinder Concrete Hollow Block(c)		
a—Unplastered	3(p)	4-hr
Solid Brick—Clay or shale, re-entrant space filled with brick and mortar		
	3¾	4-hr
	2¼	1-hr
Metal or Wire Lath, except as noted, and Plaster		
a—Sanded gypsum plaster (mix 1-3)	2¼ (q)	2-hr
	5⁄8	1-hr

Table No. 804-A, cont.

Protective Material	Thickness inches	FRR hours
b—Sanded portland cement plaster (mix 1-2½)	2¾ (q) 7/8	2-hr 1-hr
c—Vermiculite or perlite-portland cement plaster	(r)	4-hr
d—Vermiculite-gypsum or perlite- gypsum plaster	(a) (b) (s)	4-hr 3-hr 2-hr
Gypsum Lath and Plaster		
a—Sanded gypsum plaster	(x) (t)	3-hr 1-hr
b—Vermiculite-gypsum or perlite- gypsum plaster	(u) (v) (w)	4-hr 3-hr 2-hr

Reference Notes to Table 804-A

- (a) 1¾ inch perlite-gypsum or vermiculite-gypsum plaster over self furring metal lath wrapped around column—no back-fill; 1½ inch vermiculite-gypsum or perlite-gypsum plaster over metal lath—lath furled out 1¼ inches from column flanges, with space between lath and column flanges filled with the same plaster—no back-fill; or 1 inch vermiculite-gypsum or perlite-gypsum plaster over metal lath—lath spaced 1 inch from flanges of column—loose vermiculite back-fill; or 1½" perlite-gypsum plaster or vermiculite-gypsum plaster over metal lath furled not less than 7/16" from column by ¾" channels—no back-fill.
- (b) 1 inch vermiculite-gypsum or perlite-gypsum plaster over metal lath—lath furled out 1¼ inches from column flanges with space between column flanges and lath filled with vermiculite-gypsum or perlite-gypsum plaster—no back-fill; or 1¾ inch perlite-gypsum or vermiculite-gypsum plaster on self-furring metal lath wrapped around column—no back-fill.
- (c) Concrete shall be held in place with wire ties consisting of No. 5 B & S gauge (0.18 in. diam.) steel wire spirally around the column on a pitch of 8 in., or equivalent ties.
- (d) Concrete shall be held in place with wire mesh or expanded metal having not larger than 4" mech, weighing not less than 1.7 lbs. per sq. yd., or equivalent.

- (e) The ratings indicated are applicable to steel columns 6"x6" or larger.
- (f) Structural steel columns protected with 2" hollow clay or shale tile, having wire mesh in horizontal joints, flanges covered with mortar or concrete, re-entrant space filled with concrete, shall have a fire-resistance rating of 4-hours if minimum area of solid material is not less than 225 sq. in. For columns of less size two 2" layers of hollow clay or shale tile, $\frac{1}{2}$ " mortar between tile and column, $\frac{3}{8}$ " metal mesh in horizontal joints, hollow clay tile fill, shall be required for 4-hour rating.
- (g) Hollow clay tile with outside wire ties (not less than No. 12 B & S gauge—0.08" diameter steel wire tied around the outside of each course of tile at the middle) or with $\frac{3}{8}$ " metal mesh in horizontal joints; limestone or trap rock concrete fill extending 1" outside column on all sides.
- (h) Hollow clay tile with outside wire ties (not less than those prescribed in Reference Note (g) herein), with or without concrete fill; $\frac{3}{4}$ " mortar between column and tile.
- (i) $\frac{3}{4}$ " mortar between column and tile; $\frac{3}{8}$ " metal mesh in horizontal joints; limestone concrete fill.
- (j) $\frac{3}{8}$ " metal mesh (or equivalent ties) in horizontal joints; 1" gypsum mortar on flange; poured gypsum fill, or re-entrant space filled with gypsum block and mortar.
- (k) Same as prescribed in Reference Note (j) herein—or $\frac{7}{8}$ "x12 gauge (or equivalent) metal cramps, at horizontal joints, set in holes drilled in blocks; 1" gypsum mortar on flange at horizontal joints only; re-entrant space not filled.
- (m) Metal or wire lath, or mesh (or equivalent ties) in horizontal joints; $\frac{1}{2}$ " mortar between column and block; poured gypsum fill, or re-entrant space filled with gypsum block and mortar or $\frac{7}{8}$ "x12 gauge (or equivalent) metal cramps, at horizontal joints, set in holes drilled in blocks; re-entrant space not filled.
- (n) $\frac{7}{8}$ "x12 gauge (or equivalent) metal cramps, at horizontal joints, set in holes drilled in blocks; re-entrant space not filled.
- (o) Same as prescribed in Reference Note (n) herein except $\frac{1}{4}$ " mortar is required between column flange and block.
- (p) $1\frac{1}{4}$ " mortar between column and block; re-entrant space filled with broken block and mortar.
- (q) Total thickness, consisting of two equal layers of plaster, with $\frac{3}{4}$ " air space between, provides a fire-resistance rating of $2\frac{1}{2}$ hours; no fill.

- (r) For definition of Grade A Concrete and Grade B Concrete, see Section 801.08.
- (s) 1 inch vermiculite-gypsum or perlite-gypsum plaster over metal lath—lath furred out $1\frac{1}{4}$ inch from column flanges—no back-fill; or 1 inch perlite-gypsum or vermiculite-gypsum plaster over self-furring metal lath wrapped around column—no back-fill.
- (t) $\frac{3}{8}$ inch perforated gypsum lath applied vertically with double strands 18 gauge tie wire spaced 2 inches from ends of lath and 15 inches center to center at intermediate points—plastered with $\frac{1}{2}$ inch sanded gypsum plaster (mix 1:2 $\frac{1}{2}$).
- (u) Two layers $\frac{1}{2}$ inch long-length gypsum lath tied with double strand 18 gauge tie wire spaced approximately 24 inches center to center and wrapped with 1 inch hexagonal mesh, 20 gauge galvanized fabric—two $\frac{3}{4}$ inch coats perlite-gypsum or vermiculite-gypsum plaster—no back-fill.
- (v) $\frac{3}{8}$ inch perforated gypsum lath applied vertically with double strands of 18 gauge tie wire spaced 2 inches from ends of lath and 15 inches center to center at intermediate points—plastered with 1 $\frac{3}{8}$ " vermiculite-gypsum or perlite-gypsum plaster (mix 1:2, 1:3); or $\frac{1}{2}$ inch long length gypsum lath tied with double strands 18 gauge tie wire spaced approximately 24 inches center to center—two $\frac{3}{4}$ inch coats perlite-gypsum plaster (100 lbs. gypsum to 2 $\frac{1}{2}$ cubic feet perlite) applied separately with 1 inch hexagonal mesh, 20 gauge galvanized fabric wrapped around column over first coat of plaster; or two layers $\frac{1}{2}$ inch long-length gypsum lath tied with double strands 18 gauge tie wire spaced 24 inch center to center and wrapped with 1 inch hexagonal mesh, 20 gauge galvanized wire fabric-plastered with 1 inch vermiculite-gypsum or perlite-gypsum plaster (100 lbs. gypsum to 2 $\frac{1}{2}$ cubic feet vermiculite or perlite).
- (w) $\frac{3}{8}$ inch perforated gypsum lath applied vertically and tied with double strands 18 gauge tie wire spaced 2 inches from ends of lath and 15 inches center to center at intermediate points—plastered with 1 inch vermiculite-gypsum or perlite-gypsum plaster (100 lbs. gypsum to 2 $\frac{1}{2}$ cubic feet vermiculite or perlite).
- (x) $\frac{3}{8}$ in ch perforated gypsum lath applied vertically with double strands 18 gauge tie wire spaced 2 inches from ends of lath and 15 inches center to center at intermediate points—plastered with 2 inches sanded-gypsum plaster (mix 1-2, 1-3).
- (y) 2 inch vermiculite-portland cement plaster (4 cu. ft. vermiculite to 94 lbs. portland cement) over paper-backed 16 gauge wire fabric wrapped around column.

Additional layer 16 gauge plain fabric over scratch coat; or 2½" perlite-portland cement plaster (3½ cu. ft. perlite to 100 lbs. portland cement) over paper-backed 16 gauge wire fabric wrapped around column. Additional layer 16 gauge plain fabric over scratch coat.

CHAPTER 805

FIRE RESISTANCE RATINGS FOR
PROTECTED STEEL BEAMS, GIRDERS AND TRUSSES

805.01—General

The fire-resistance of protected steel beams, girders, and trusses shall be rated as indicated for the various protective materials in this Chapter and in Table No. 805-A, except as provided in Chapter 801. See also the general requirements following Table No. 805-A.

Gypsum or portland cement plaster, not less than $\frac{5}{8}$ " in thickness, applied over face of metal lath or wire lath and in contact with the concrete, may be substituted for $\frac{1}{2}$ inch of the required poured protection, provided that such poured protection shall in no case be reduced to less than 1 inch in thickness. Metal or wire lath used for such purposes shall conform to the provisions of Section 801.08.

805.02—General Requirements—Fire Resistance Ratings for
Protected Steel Beams, Girders and Trusses

For the foregoing ratings in Table No. 805-A, fire-resistive materials shall protect flanges and portions of webs and members not otherwise protected by arches, slabs, or ceilings.

For ratings of Steel Floor and Roof Assemblies, see Chapter 807.

805.03—Thickness

For block and poured protections, thicknesses in Table No. 805-A refer to thicknesses of protective material before the application of plaster. Such thickness shall be measured from the extreme outer edge of the member, except that the thickness of protective material required at the extreme edges of lugs, brackets, wind bracing and other connections shall be not less than 1 inch.

805.04—Reinforcement

Except as otherwise prescribed, poured protections listed in Table No. 805-A shall be adequately reinforced with 4"x4" wire mesh weighing not less than 1½ lbs. per square yard, or equivalent reinforcement.

805.05—Mortar

Protective coverings of masonry units shall be solidly bedded and laid in portland cement or portland cement-lime mortar, except that gypsum blocks shall be laid in gypsum mortar and structural clay tile units may likewise be laid in gypsum mortar.

805.06—Bonds or Ties

Block and tile protective coverings shall be securely anchored or bonded by wall ties or metal mesh laid in the

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horizontal joints, by metal clips connecting other, by outside tie wires not smaller than No. 10 gauge (0.08" diameter) with at least one stud in every course, or by means of units. Outside studs in all cases be protected by at least 1/2" of mortar.

805.07—Plaster Thickness

Except as otherwise prescribed in Table 805.08, wherever plaster is required to be applied to masonry or portland cement plaster not less than 1/2" shall be used except that on gypsum units, gypsum plaster shall be used. Thickness of plaster shall be measured on the face of the plaster base.

805.08—Metal Lath or Wire Lath

Metal lath or wire lath shall meet the requirements of Section 801.08 of this code.

Table No. 805-A

Fire Resistance Ratings
Protected Steel Beams, Girders and Trusses

Protective Material	Minimum Thickness of Protective Material Inches	Fire Resistance Rating in hours
Concrete—re-entrant space filled solid		
Grade A concrete(a)	2	4-hr
Grade B concrete(b)	1 1/2	2 1/2-hr
	1	1-hr
	2 1/2	4-hr
	2	2 1/2-hr
	1 1/2	1-hr
Hollow Clay or Shale Tile or Concrete Block		
Unplastered—		
Plastered—1/2" sanded portland cement or gypsum plaster	2(c)	2-hr
	2	1-hr
	3(c)	4-hr
	2(c)	3-hr
	2	2-hr
Gypsum—Poured space filled Solid, re-entrant		
Unplastered—		
	2	4-hr
	1 1/2	2 1/2-hr
	1	1 1/2-hr

Table No. 805-A, cont.

Protective Material	Thickness inches	FRR hours
Plastered— $\frac{1}{2}$ " sanded gypsum plaster	$1\frac{1}{2}$ 1 $\frac{1}{2}$	4-hr $2\frac{1}{2}$ -hr $1\frac{1}{2}$ -hr
Gypsum—Solid Block		
Unplastered—joints grouted	2	$2\frac{1}{2}$ -hr
Plastered— $\frac{1}{2}$ " sanded gypsum plaster	2	4-hr
Gypsum—Hollow Block		
Unplastered—joints grouted	3	3-hr
Plastered— $\frac{1}{2}$ " sanded gypsum plaster	3	4-hr
Brick—Hollow or Solid, clay, concrete or sand-lime		
Unplastered—	$3\frac{3}{4}$ $2\frac{1}{4}$	4-hr 2-hr
Metal or Wire Lath; except as noted, and Plaster(r)		
Sanded portland cement plaster	(n) (l) (m)	2-hr $1\frac{1}{2}$ -hr 1-hr
Sanded gypsum plaster	(d) (g) (j) (k)	$2\frac{1}{2}$ -hr 2-hr $1\frac{1}{2}$ -hr 1-hr
Unsanded gypsum plaster	(h) (i)	3-hr $2\frac{1}{2}$ -hr
Vermiculite-gypsum or perlite-gypsum plaster	(e) (f) (o) (p)	4-hr 3-hr $2\frac{1}{2}$ -hr 2-hr

Reference Notes to Table No. 805-A

- (a) Grade A Concrete shall comply with the requirements in Section 801.03—metal ties bent around beam flanges and other projecting parts.
- (b) Grade B Concrete shall comply with the requirements in Section 801.03—3 inch or smaller metal mesh placed 1 inch from surface.
- (c) All spaces between structural member and tile or block shall be filled solid.
- (d) Ceiling—3" sanded gypsum plaster (mix 1-3) over face of metal or wire lath directly attached, furred or suspended—non-combustible construction above, or
Individual Protection—2¼" total thickness of metal lath and sanded gypsum plaster (mix 1-3) consisting of two layers of plaster, each ⅝" over face of lath, with ¼" air space between.
- (e) Ceiling—⅞" vermiculite-gypsum or perlite-gypsum plaster over face of metal lath directly attached, furred or suspended or ⅝" vermiculite-gypsum plaster plus ½" vermiculite acoustical plastic over face of metal lath—non-combustible construction above, or
Individual Protection—1½" vermiculite-gypsum or perlite-gypsum plaster over face of metal lath wrapped directly around member.
- (f) Ceiling—⅝" vermiculite-gypsum or perlite-gypsum plaster over face of metal lath directly attached, furred or suspended—non-combustible construction above, or
- (g) Ceiling—⅝" sanded gypsum plaster (mix 1-2, 1-3) over face of metal or wire lath or paper-backed wire fabric directly attached, furred or suspended—non-combustible construction above.
- (h) Ceiling—⅞" unsanded gypsum plaster over face of metal or wire lath directly attached, furred or suspended—non-combustible construction above.
- (i) Ceiling—⅞" unsanded gypsum plaster over face of metal or wire lath directly attached, furred or suspended—non-combustible construction above.
- (j) Ceiling—⅝" sanded gypsum plaster (mix 1-2, 1-3) over face of metal or wire lath directly attached, furred or suspended—non-combustible construction above, or
Individual Protection—⅞" sanded gypsum plaster (mix 1-3) over face of metal lath.
- (k) **Individual Protection**—⅝" sanded gypsum plaster (mix 1-3) over face of metal lath.
- (l) Ceiling—⅝" sanded portland cement plaster (mix 1-2, 1-3) with 15 lbs. hydrated lime and 3 lbs. short asbestos fiber per bag of portland cement) over face of metal

lath directly attached, furred or suspended—non-combustible construction above, or

- (m) **Individual Protection**— $\frac{7}{8}$ " sanded portland cement plaster (mix 1-2 $\frac{1}{2}$) over face of metal lath.
- (n) **Individual Protection**—2 $\frac{1}{2}$ " total thickness of metal lath and sanded portland cement plaster (mix 1-2 $\frac{1}{2}$) consisting of two layers of plaster, each $\frac{3}{4}$ " thick over face of lath, with $\frac{3}{4}$ " air space between.
- (o) **Individual Protection**—1" vermiculite-gypsum or perlite-gypsum plaster over face of metal lath wrapped directly around member.
- (p) **Individual Protection**— $\frac{7}{8}$ " vermiculite-gypsum or perlite-gypsum plaster over face of metal lath wrapped directly around member.
- (r) In addition to the ratings shown in this Table No. 805-A for steel beams, girders and trusses protected by a ceiling, any ceiling protection described in Table No. 807-A under Steel Joist Construction and Formed Steel Members, Cellular and Corrugated Steel Floor and Roof Units, Ribbed Steel Roof Units and Steel Roof Deck Construction shall be accepted as providing the same rating for steel beams, girders and trusses as the rating designated in Table No. 807-A for the floor or roof construction.

When a ceiling construction is used for protection of steel beams, girders or trusses which support a floor or roof, the construction shall also meet the requirements of Table No. 807-A for the rating designated.

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CHAPTER 806

FIRE RESISTANCE RATINGS FOR REINFORCED
CONCRETE COLUMNS, BEAMS, GIRDERS AND TRUSSES

806.01—General

The fire-resistance of floor and roof constructions described in this section shall be rated in accordance with this section and Table No. 806-A except as provided in Chapter 801.

Where plaster ceiling is required in Table No. 806-A and no thickness is specified, plaster shall be not less than $\frac{1}{2}$ inch thick. On gypsum units, gypsum plaster only shall be used. Thickness of plaster shall be measured from the face of the plaster base.

Wood finish floors may be used with the constructions rated in this section, unless prohibited elsewhere in this code.

Table No. 806-A

Fire Resistance Ratings
Reinforced Concrete Columns, Girders and Trusses

Quality of Concrete	Minimum Thickness Outside Reinforcing Steel inches	Fire Resistance Ratings hours
Reinforced Concrete Columns (a)		
Concrete: Coarse aggregate limestone, calcareous gravel(b), trap rock or blast furnace slag—columns round or square 12" or larger—unplastered.	1½	4-hr
Concrete: coarse aggregate granite, sandstone or siliceous gravel(c)—columns round or square 16" or larger		
Unplastered—	2½	4-hr
	1½	3-hr
Plastered(e)—	1½	4-hr
Concrete: coarse aggregate granite, sandstone or siliceous gravel(e)—light 2" mesh expanded metal or equivalent centrally located in the protective covering		
Columns round or square 12 to 14"—unplastered	1½	3-hr
Columns round or square 14" or larger—unplastered	1½	4-hr

Table No. 806-A, cont.

Quality of Concrete	Thickness inches	FRR hours
Reinforced Concrete Beams, Girders and Trusses		
Concrete: grade A ^(d) —unplaster- ed	1½ 1	4-hr 1-hr
Concrete: grade B ^(d) —unplaster- ed	2½ 2 1½	4-hr 2-hr 1-hr
Concrete: grade B ^(d) —unplaster- ed, 3" or smaller metal mesh cen- trally located in protective cover- ing	2 1½ 1	4-hr 3-hr 1-hr

Reference Notes to Table No. 806-A

- (a) These ratings apply to columns with standard ties or spirals, and to columns without spirals, if designed on the basis that the protective concrete covering carries no load.
- (b) Gravel containing not more than 10% quartz, chert, or flint.
- (c) Gravel containing 60% or more of quartz, chert, or granite.
- (d) Grade A Concrete and Grade B Concrete shall comply with the requirements in Section 801.03.
- (e) ½" coarse aggregate; column covered with 1 inch of 1-2½ (by volume) portland cement and sand or gypsum and sand plaster, with admixture of not over ½ part lime; surface of column hacked or column cast in metal lath serving as a form.

CHAPTER 807

FIRE RESISTANCE RATINGS FOR
FLOOR AND ROOF CONSTRUCTIONS

807.01—General

The fire resistance of floor and roof constructions described in this section shall be rated in accordance with this section and Table No. 807-A, except as provided in Chapter 801.

Where plaster ceiling is required in Table No. 807-A and no thickness is specified, plaster shall be not less than $\frac{1}{2}$ " thick. On gypsum units, gypsum plaster only shall be used. Thickness of plaster shall be measured from the face of the plaster base except that in the case of metal or wire lath, it shall be measured from the back of the lath.

Wood finish floors may be used with the constructions rated in this section, unless prohibited elsewhere in this Code.

Table No. 807-A
Fire Resistance Ratings
Floor and Roof Constructions

Construction	Fire Resistance Ratings hours
Reinforced Concrete(g)	
4½" slab, expanded slag aggregate, ¾" protection of reinforcement.	4-hr
6" slab, air-cooled slag aggregate, 1" protection of reinforcement.	4-hr
3" slab, Grade A concrete; Ceiling, 1" vermiculite-gypsum or perlite-gypsum plaster over face of metal lath supported from bottom of slab.(f)(g)	4-hr
6" slab, Grade A or Grade B concrete (Section 801.02), 1" protection of reinforcement.	3-hr
2" slab, Grade A concrete; Ceiling, ¾" vermiculite-gypsum or perlite-gypsum plaster over face of metal lath supported from bottom of slab.(f)(g)	3-hr
4¾" slab, air-cooled slag aggregate, ¾" protection of reinforcement.	2½-hr
4¾" slab, Grade A or Grade B concrete (Section 801.02), ¾" protection of reinforcement.	2-hr
4" slab, Grade A or Grade B concrete (Section 801.02), ¾" protection of reinforcement.	1-hr

Table No. 807-A, cont.

Construction	FRR hours
Concrete Joist Construction(ε) Reinforced concrete top slab on concrete joists not less than 4" wide and not over 30" on centers with ¾" minimum protection for reinforcement, and having plastered ceiling over face of metal lath. 2½" top slab; ceiling ⅞" unsanded gypsum plaster or ⅝" vermiculite-gypsum or perlite-gypsum plaster. 2¼" top slab; ceiling ⅝" sanded gypsum plaster (mix 1-2, 1-3) 2" top slab; ceiling ⅝" sanded gypsum plaster (mix 1-2, 1-3) or ⅝" sanded portland cement plaster (mix 1-3 with 15 lbs. of hydrated lime and 3 lbs. of short asbestos fiber per bag of cement).	 3-hr 2-hr 1½-hr
Concrete and Tile Tile and concrete composite construction consisting of tile fillers of concrete, gypsum, or structural clay tile not less than 4" deep, with reinforced concrete ribs (¾" protection for reinforcement) and concrete top slab not less than 2" thick. Tile and concrete, composite construction as prescribed above except omitting the top slab and having a gypsum plastered ceiling.	 2½-hr 1½-hr
Gypsum Poured reinforced gypsum slab at least 3" thick having ¾" minimum protection for reinforcement and with a ceiling of gypsum plaster.	 2½-hr
Brick Brick arch not less than 4" deep with a level concrete fill 2" above crown.	 2½-hr
Clay Tile Flat arch of clay tile, 2-cell structural tile not less than 8" deep, with floor fill of incombust-	

Table No. 807-A, cont.

Construction	FRR hours
ible material at least 2" thick and having gypsum plaster ceiling.	2½-hr
Segmental arch of clay tile, 2-cell structural tile not less than 6" deep, laid in cement mortar with concrete fill level with crown of arch, and having gypsum plaster ceiling.	2½-hr
Steel Joist Construction and Formed Steel Members (a) (e) (g) (Using Contact, Furred, or Suspended Ceilings)—Constructions With Metal or Wire Lath—Except as Noted—Ceilings) Top Slab—2½" poured concrete top slab or 2" precast gypsum tile, the latter with ½" mortar finish; or 2" reinforced gypsum concrete slab on ½" gypsum wallboard. Ceiling—⅞" vermiculite-gypsum or perlite-gypsum plaster over face of metal lath.	4-hr
Top Slab—2½" poured concrete top slab, 2½" vermiculite-concrete top slab, or 2" precast gypsum tile, the latter with ½" mortar finish. Ceiling—⅝" vermiculite-gypsum or perlite-gypsum plaster or ⅞" unsanded gypsum plaster over face of metal lath.	3-hr
Top Slab—2" poured concrete top slab; or 2¾" portland cement concrete plank. Ceiling—1" vermiculite-gypsum or perlite-gypsum plaster over face of metal lath.	3-hr
Top Slab—2½" poured concrete top slab. Ceiling—¾" sanded gypsum plaster (mix 1-2) over face of metal or wire lath.	2½-hr
Top Slab—2" poured concrete top slab or 2" precast gypsum tile, the latter with ¼" mortar finish. Ceiling—⅝" vermiculite-gypsum or perlite-gypsum plaster or ⅞" unsanded gypsum plaster over face of metal or wire lath.	2½-hr
Top Slab—2¼" poured concrete top slab or 2" precast gypsum tile, the latter with ¼"	

Table No. 807-A, cont.

Construction	FRR hours
mortar finish. Ceiling— $\frac{5}{8}$ " sanded gypsum plaster (mix 1-2, 1-3) over face of metal or wire lath or paper-backed wire fabric.	2-hr
Top Slab—2" poured concrete top slab; or 2" precast gypsum tile. Ceiling— $\frac{5}{8}$ " sanded gypsum plaster (mix 1-2, 1-3) or $\frac{5}{8}$ " sanded portland cement plaster (mix 1-2, 1-3—with 15 lbs. hydrated lime and 3 lbs. short asbestos fiber per bag of portland cement) over face of metal lath.	1½-hr
Top Slab—1" nominal single wood floor on wood nailers applied to steel deck with insulating paper cemented thereto; or double wood deck on wood nailers attached to steel joists or formed steel members. Ceiling— $\frac{5}{8}$ " sanded gypsum plaster (mix 1-2, 1-3); or $\frac{5}{8}$ " sanded portland cement plaster (mix 1-2, 1-3—with 15 lbs. hydrated lime and 3 lbs. short asbestos fiber per bag of portland cement) over face of metal or wire lath.	1-hr
Steel Joist Construction and Formed Steel Members (a) (e) (g) (Constructions with Gypsum Lath Ceilings) Top Slab—2" poured concrete top slab. Ceiling— $\frac{3}{4}$ " furring channels, spaced 12", $\frac{3}{8}$ " perforated gypsum lath attached to furring channels with approved interlocking wire clips; 1" gypsum-perlite or gypsum-vermiculite plaster (100:2, 100:3), reinforced with 1" 20 gauge hexagonal mesh attached to furring channels.	4-hr
Top Slab—2" poured concrete top slab. Ceiling— $\frac{3}{4}$ " furring channels, spaced 12", $\frac{3}{8}$ " perforated gypsum lath attached to furring channels with approved interlocking wire clips; $\frac{5}{8}$ " gypsum-perlite or gypsum-vermiculite plaster (100:2, 100:3) reinforced with 14 gauge galvanized wire below lath and diagonally between interlocking device of wire clips.	3-hr

Table No. 807-A, cont.

Construction	FRR hours
<p>Top Slab—2" poured concrete top slab.</p> <p>Ceiling—$\frac{3}{4}$" furring channels, spaced 16", $\frac{3}{8}$" perforated gypsum lath attached to furring channels with approved interlocking clips; $\frac{1}{2}$" gypsum-perlite or gypsum-vermiculite plaster (100:2$\frac{1}{2}$) reinforced with 1" 20 gauge hexagonal mesh attached to furring channels.</p>	3-hr
<p>Top Slab—2" poured concrete top slab.</p> <p>Ceiling—$\frac{3}{4}$" furring channels, spaced 12", $\frac{3}{8}$" perforated gypsum lath attached to furring channels with approved interlocking wire clips; $\frac{1}{2}$" gypsum-perlite or vermiculite-plaster (100:2$\frac{1}{2}$) reinforced with 14 gauge galvanized wire below lath and diagonally between interlocking device of wire clips and $\frac{5}{8}$" gypsum acoustical plaster.</p>	2 $\frac{1}{2}$ -hr
<p>Top Slab—2" poured concrete top slab.</p> <p>Ceiling—$\frac{3}{4}$" furring channels, spaced 16", $\frac{3}{8}$" perforated gypsum lath attached to furring channels with approved inter-locking wire clips; $\frac{1}{2}$" gypsum-perlite or gypsum-vermiculite plaster (100:2$\frac{1}{2}$) reinforced with 14 gauge galvanized wire below lath and diagonally between interlocking device of wire clips.</p>	2-hr
<p>Top Slab—2" poured concrete top slab.</p> <p>Ceiling—$\frac{3}{4}$" furring channels, spaced 16", $\frac{3}{8}$" perforated gypsum lath attached to furring channels with approved interlocking wire clips; 1" of gypsum-perlite or gypsum-vermiculite plaster (100:2, 100:3).</p>	1 $\frac{1}{2}$ -hr
<p>Top Slab—2" poured concrete top slab.</p> <p>Ceiling—$\frac{3}{4}$" furring channels, spaced 16", $\frac{3}{8}$" perforated gypsum lath attached to furring channels with approved interlocking wire clips; $\frac{5}{8}$" gypsum-perlite or gypsum-vermiculite plaster (100:2$\frac{1}{2}$).</p>	1-hr
Steel Joist Construction and Formed Steel Members (a) (e)	
<p>Top Slab—2" poured concrete top slab.</p> <p>Ceiling—$\frac{3}{4}$" acoustical tile (glass fiber) attached to $\frac{3}{4}$" furring channels, 4' on center,</p>	

Table No. 807-A, cont.

Construction	FRR hours
with clips and splines—2 layers of mineral wool (2" thick each) with aluminum foil center placed on top of unexposed surface of tile.	2-hr
Top Deck —2" cinder concrete (minimum thickness over cells). Ceiling — $\frac{7}{8}$ " vermiculite-gypsum or perlite-gypsum plaster (mix 100 lbs. gypsum to 2½ cu. ft. aggregate) over face of metal lath.	4-hr
Cellular Steel Floor and Roof Units (b) (c) (g)	
Top Deck —2" concrete (minimum thickness over cells). Ceiling — $\frac{7}{8}$ " vermiculite-gypsum or perlite-gypsum plaster over face of metal lath.	4-hr
Top Deck —2½" concrete (minimum thickness over cells). Ceiling — $\frac{5}{8}$ " vermiculite-gypsum plaster plus ½" vermiculite acoustic plastic over face of metal lath.	4-hr
Top Deck —2" concrete (minimum thickness over cells). Ceiling — $\frac{7}{8}$ " unsanded gypsum plaster over face of metal lath.	4-hr
Top Deck —2½" concrete (minimum thickness over cells). Ceiling —1" perlite-gypsum or vermiculite-gypsum plaster (mix 100 lbs. gypsum to 2½ cu. ft. aggregate) over face of $\frac{3}{8}$ " ribbed metal lath tied directly to underside of floor units.	4-hr
Top Deck —2½" concrete (minimum thickness over cells). Ceiling — $\frac{5}{8}$ " perlite-gypsum or vermiculite-gypsum plaster plus ½" gypsum acoustical plaster over face of metal lath.	4-hr
Top Deck —2½" concrete (minimum thickness over cells). Ceiling — $\frac{3}{4}$ " furring channels, spaced 12", $\frac{3}{8}$ " perforated gypsum lath attached to furring channels with approved interlocking clips; ½" vermiculite-gypsum or perlite-gypsum plaster (100:2½) reinforced with 14 gauge galvanized wire below lath and diagonally between interlocking device of wire clips.	3-hr

Table No. 807-A, cont.

Construction	FRR hours
Corrugated Steel Floor Units^(e)(g)	
Top Slab—4½" concrete (measured from bottom of corrugations) Ceiling—1" vermiculite-gypsum or perlite-gypsum plaster over face of furred or suspended metal lath.	4-hr
Top Slab—4½" concrete (measured from bottom of corrugations) Ceiling—¾" vermiculite-gypsum or perlite-gypsum plaster over face of metal lath attached directly to bottom of floor units and with plaster pushed through lath to fill the corrugations of the units.	4-hr
Top Slab—4½" concrete (measured from bottom of corrugations) Ceiling—½" (measured from bottom of corrugations) vermiculite-acoustical plastic applied directly to underside of steel floor units.	4-hr
Top Slab—4½" expanded shale concrete (measured from bottom of corrugations) Ceiling—Not required.	3-hr
Top Slab—5¼" concrete (Grade A) (measured from bottom of corrugations) Ceiling—Not required.	2-hr
Top Slab—4½" concrete (Grade A) (measured from bottom of corrugations) Ceiling—Not required.	1-hr
Corrugated Steel Roof Units^(e)	
Top Slab—3½" perlite concrete (measured from bottom of corrugation, average thickness 2½" perlite concrete) reinforced with welded wire mesh. Ceiling—Not required.	1-hr
Ribbed Steel Roof Units^(e)	
Top Slab—3" vermiculite concrete (overall thickness) on ribbed steel roof unit with ribs extending up into concrete. Concrete reinforced with welded wire mesh. Ceiling—Not required.	1½-hr

Table No. 807-A, cont.

Construction	FRR hours
Steel Roof Deck Construction(c) (e) (g)	
Deck—Steel deck covered with not less than 2" nominal thickness of vermiculite concrete, or equivalent. Ceiling— $\frac{7}{8}$ " vermiculite-gypsum or perlite-gypsum plaster (mix 100 lbs. of gypsum to $2\frac{1}{2}$ cu. ft. of vermiculite or perlite) over face of metal lath.	4-hr
Deck—Steel deck covered with not less than 1" nominal thickness of insulation board consisting of shredded wood bonded with portland cement, or equivalent. Ceiling— $\frac{7}{8}$ " vermiculite-gypsum, plaster (mix 100 lbs. of gypsum to $2\frac{1}{2}$ cu. ft. of vermiculite or perlite) over face of metal lath.	3-hr
Deck—Steel deck covered with not less than 1" nominal thickness of insulation board consisting of felted glass fiber or equivalent. Ceiling— $\frac{7}{8}$ " vermiculite-gypsum or perlite-gypsum plaster (mix 100 lbs. of gypsum to $2\frac{1}{2}$ " cu. ft. of vermiculite or perlite) over face of metal lath.	2-hr
Deck—Steel deck covered with not less than $1\frac{1}{2}$ " nominal thickness of wood fiber-board insulation, or equivalent. Ceiling— $\frac{7}{8}$ " sanded gypsum plaster (mix 1-2) over face of metal lath.	2-hr
Deck—Steel deck covered with not less than $1\frac{1}{2}$ " nominal thickness of insulation consisting of wood fiber and a cement binder, or equivalent. Ceiling— $\frac{3}{4}$ " sanded gypsum plaster (mix 1-2) over face of metal lath.	2-hr
Deck—Steel deck covered with not less than 1" nominal thickness of wood fiber-board insulation, or equivalent. Ceiling— $\frac{5}{8}$ " sanded gypsum plaster (mix 1-2, 1-3) over face of metal lath.	1½-hr
Wood Joist Construction(d)	
Ceiling Protection— $\frac{5}{8}$ " sanded gypsum plaster (mix 1-2, 1-3) or $\frac{5}{8}$ " sanded portland cement plaster (mix 1-2, 1-3—with 15 lbs. of hydrated lime and 3 lbs. of short asbestos fiber	

Table No. 807-A, cont.

Construction	FRR hours
per bag of portland cement)—plaster shall be applied over face of metal lath which shall be attached to joists as prescribed in Section 801.02.	1-hr
Ceiling Protection — $\frac{1}{2}$ " sanded gypsum plaster (mix 1-2) applied on $\frac{3}{8}$ " perforated gypsum lath which shall be nailed to joists in the manner prescribed in Section 801.07. Joints of gypsum lath shall be covered with 3" strips of metal lath attached with $1\frac{1}{4}$ ", No. 12 gauge nails having $\frac{1}{2}$ " heads, spaced not over 5" apart along joists, and 2 nails per joist for strips running perpendicular to the joists.	1-hr
Ceiling Protection — $\frac{1}{2}$ " vermiculite-gypsum or perlite-gypsum plaster (mix 100 lbs. of gypsum to $2\frac{1}{2}$ cu. ft. of aggregate) applied on $\frac{3}{8}$ " perforated gypsum lath which shall be nailed to joists in the manner prescribed in Section 801.07.	1-hr
Ceiling Protection —Two layers of $\frac{1}{2}$ " gypsum wallboard (see Section 801.07) separated by 20 gauge galvanized wire fabric with 1" hexagonal mesh. First (upper) layer of gypsum wallboard applied to bottom of joists with 5d cement-coated box nails, No. 15 gauge, $1\frac{5}{8}$ " long, with $\frac{7}{32}$ " diameter heads, at 18" c. to c., or equivalent.	1-hr
Wire fabric nailed over first layer of gypsum wallboard with 8d cement-coated box nails, No. $12\frac{1}{2}$ gauge, $2\frac{3}{8}$ " long, with $\frac{1}{4}$ " diameter heads, at 5" to 7" c. to c., or equivalent. Second layer of gypsum wallboard nailed with 8d cement-coated box nails No. $12\frac{1}{2}$ gauge, $2\frac{3}{8}$ " long, with $\frac{1}{4}$ " diameter heads, at 5" to 7" c. to c., or equivalent.	1-hr
Ceiling Protection — $\frac{5}{8}$ " vermiculite-gypsum or perlite-gypsum plaster applied over face of metal lath which shall be attached to joists as prescribed in Section 801.08.	1-hr
Ceiling Protection —One layer of $\frac{5}{8}$ " gypsum wallboard with a specially formulated core which provides greater fire resistance than regular wallboard of the same thickness. Wallboard nailed with $1\frac{1}{8}$ " nails, 6 inches on centers, or equivalent.	

Reference Notes to Table No. 807-A

- (a) **Steel Joist Construction and Formed Steel Members—Construction:** Top slabs or top decks as prescribed in Table 806A, supported on open or solid-web steel joists, formed steel members, or rolled steel beams, having plaster ceilings applied on metal or wire lath attached directly to the under side of the steel members or furred or suspended therefrom, or applied on perforated gypsum lath furred therefrom.

Metal or wire lath of approved weight serving as a form for poured concrete or gypsum top slabs may be considered as reinforcement. Where a steel deck provides the load carrying properties, reinforcement of the concrete or gypsum fill may be omitted.

Specified slab thicknesses shall be measured from the top of supporting steel members. If precast top decks of concrete or gypsum are used, joints shall be grouted or be so constructed to provide tight end and side joints. Mortar finish shall be applied to top of 2" precast slabs to make up the prescribed thickness of top slab when thickness greater than 2" is required.

- (b) **Cellular Steel Floor and Roof Units—Construction** composed of steel formed into units of two or more cells; depth of units not less than 1½" inches and distance between cells not less than 2 inches. The top deck and ceiling protection shall be as prescribed in Table No. 807-A. Except as otherwise noted, the ceiling shall be furred or suspended so as to form an air-space between underside of cellular panel and back of lath.
- (c) **Steel Roof Deck Construction—**Steel deck covered with insulation of the kind and thickness not less than that prescribed in Table No. 807-A, or equivalent and supported on steel framing, protected with a suspended ceiling of metal lath and plaster as prescribed for the ratings indicated.
- (d) **Wood Joist Construction—**Double wood floor (sub-floor ¾" sheathing, finish floor tongue and groove) with insulating paper between, supported on 2"x10" wood joists spaced 16" on centers and having plaster or gypsum wallboard ceilings as prescribed in Table No. 807-A.
- (e) The ratings for steel joist construction and formed steel members, cellular steel floor and roof units, corrugated steel floor units, corrugated steel roof units, ribbed steel roof units and steel roof deck construction are also applicable to steel beams, girders and trusses protected in the same manner, with non-combustible construction above.
- (f) Where electrical raceways and junction boxes are used

in slab an additional thickness of 2" of concrete is required.

- (g) Fire-resistive ceilings which constitute an essential part of a non-combustible floor or roof assembly to meet a required fire-resistance rating may have openings to accommodate non-combustible piping, ducts and electrical outlets. The aggregate area of such openings in the ceiling shall be not greater than 100 square inches for each 100 square feet of ceiling area. The fixtures and attachments shall be installed so as not to decrease the fire-resistance of the assembly. All duct openings shall be protected with approved non-combustible fire dampers.
- (h) **Fire Resistance Ratings for Ceilings Protecting Non-Combustible Construction**—The fire-resistance rating of any ceiling described shall be accepted as having the same fire-resistance rating as a ceiling protecting structural members of steel or other non-combustible construction above the ceiling as is designated for floor and roof construction in Table No. 807-A, provided there are no combustible materials above the ceiling.

ARTICLE IX**Regulations For Use of Public Streets
And Projections Over Public Property**

CHAPTER 901**PROTECTION OF WORKMEN AND THE PUBLIC
DURING CONSTRUCTION OR DEMOLITION****901.01—General**

The provisions of this Chapter are designed to safeguard workmen and the public, the first concern being safety to life, limb and health; to the end that owners, managers, operators, contractors and other persons responsible for the erection, alteration, demolition or repair of any building or structure or any part thereof.

901.02—Placing of Floors During Construction

In steel skeleton or wall bearing construction, temporary or permanent floors shall be provided not more than two stories apart (in no case shall the distance between these temporary floors be more than 26 feet), except such spaces as may be reasonably required for hoisting materials or other erection work.

901.03—Projection of Floor Openings

All floor openings within a building in the course of construction shall be enclosed or fenced in on all sides by a barrier of a minimum height of three feet, except on those sides which may be used for handling of materials hoisted through such openings, or at which stairs or ladders land; provided, that such sides, other than landings, shall be guarded by an adjustable barrier not less than three nor more than four feet from the floor and not less than two feet from the edge of such opening.

901.04—Strength of Temporary Supports

Every temporary support placed under any structure, wall, girder or beam, during the erection, alteration, demolition or repair of any building or structure or any part thereof, shall be of sufficient strength for safely carrying the load to be placed thereon.

901.05—Overloading to be avoided

During the construction or alteration of any building or structure no material entering into such construction or alteration shall be placed on any floor in excess of the live load that such floor is intended to safely sustain.

901.06—Scaffolding

All scaffolds used in connection with the erection, alteration or demolition of any building shall be constructed in a manner to secure the safety of the workmen on them and of all persons passing under or near them. All scaffolds used on or about buildings at a height of more than twenty feet above the street or ground level, or a floor, except scaffolding wholly within the interior of a building and covering the entire floor space of any room therein, shall be provided along the outer edges and ends with substantial railings or enclosures of wire mesh or other suitable materials, extending at least three feet above the working platform.

901.07—Scaffolding Regulations

Where materials are being hoisted or mechanics are working above an outside scaffold, the man on the scaffold shall be protected by an ample covering, the same to be never more than one story above the outside scaffold. The same sort of covering shall be used on inside work where roofs or ceilings do not afford protection.

901.08—Protection of Pedestrians on Public Property

Protection shall be provided for pedestrians as required in Table No. 901-A, and be constructed as specified in this Chapter.

Such protection shall be maintained in place and kept in good order for the entire length of time pedestrians on the street that abuts the property line may be endangered, and shall be completely removed as soon as such construction work permits.

901.081—Walkway

A walkway not less than four feet (4') wide with a railing on the street side shall be maintained on the sidewalk in front of the building site during construction, alterations or demolition.

901.082—Types of Protection Required

Railings shall be substantially built and not less than three feet (3') high.

901.084—Construction of Fences

Fences shall be substantially built of tight boards eight feet (8') high above grade, placed on the side of the walkway nearest to the building site. Fences shall extend the entire length of the building site and each end shall be turned and extended to the building line.

Doorways may be cut in the fence if they are protected by doors and kept closed except when opened to permit materials or persons to pass through.

901.085—Construction of Canopies

The protective canopy shall have a clear height of ten

feet (10') above the walkway. The roof shall be tightly boarded. Every canopy shall have a tight board fence built along its entire length, on the side thereof next to the building site. The fence shall be solid from the sidewalk or walkway to the canopy roof and each end shall be turned and extended solid to the building site.

Table No. 901-A
Type of Protection Required For Pedestrians

Height of Construction	Distance from Construction to Walkaway	Protection Required
Eight feet or less	Less than six feet	Railing
	Six feet or more	None
More than eight feet	Less than six feet	Fence and Janop
	Six feet or more and one-quarter height of construction or less	Canopy Fence and
	Six feet or more and one-fourth to one-half height of construction	Fence
	Six feet or more and at least one-half height of construction	None

The entire structure shall be designed to carry the loads to be imposed on it, provided, the minimum live load to be used in design shall be not less than 35 pounds per square foot, uniformly loaded.

If materials are stored or work is done on the roof of the canopy, the street sides and ends of the canopy roof shall be protected by a tight curb board not less than one foot (1') high and a railing not less than three feet (3') high.

The space under the canopy over the walkway and the approaches thereto shall be kept well lighted with artificial lighting continuously between sunset and sunrise.

901.09—Protection of sidewalk excavations

When the area of a portion thereof occupied by a public sidewalk is to be excavated, the holder of the building permit shall construct a substantial temporary walkway not less than four feet (4') in width for pedestrian travel over the areas to be excavated or around the same.

The walkway over the excavated area shall be designed for a uniform live load of 150 pounds per square foot. The walkway shall be provided with suitable ramps or stairs at each end and with a handrail not less than three feet (3') high along each side or with a railing on one side and a fence on the other, as the case may require.

The walkway around the excavated area shall be as close to the excavation on the street side as possible and constructed with a railing not less than three feet (3') high and a fence on the excavation side of the walkway.

901.10—Strength of Apparatus and Structures

All hoists, ropes, derricks, ladders and other similar apparatus or structures shall be constructed so as to be capable of sustaining any stresses for which they are used, on a factor of safety of not less than four.

901.11—Rope Used About Work Involving the Use of Acids

When any ropes have been used in and about any work involving the use of acids or any fluid which has a tendency to rapidly decompose or weaken such ropes, they shall not be used again for the purpose of sustaining any load until they have been thoroughly tested as specified in Section 901.10.

901.12—Railing for Scaffolds

All swinging scaffolds must be provided with a railing at least three (3) feet high.

901.13—Use of Hoists, Elevators, Etc.

The erection, alteration or repair of any building or structure where elevators, lifts, hoists or derricks are used to place materials, workmen shall be prohibited from using such elevators, lifts, hoists or derricks as a means of conveyance from one part of such building or structure to another part, and it shall be the duty of the persons in charge of such building or structure to see that this rule is complied with and observed.

901.14—Disposal of Hazards Resulting from Building Operations

The owners, managers, operators, contractors and other persons responsible for the erection, alteration or repair of any building or structure shall keep the building free from any and all debris or hazards which are likely to cause injury to workmen or the public.

901.15—Temporary Use of Streets and Alleys

No person shall place or store any material or equipment necessary for the work under a building permit on a street, alley or public sidewalk, nor shall any work be performed except in accordance with the provisions of this Chapter.

No person shall perform any work on any building or structure, if by so doing he endangers pedestrians on the street that abuts the property line, unless the pedestrians are protected as specified in this Chapter.

901.151—In Front of the Building Site

Material or equipment necessary for the work under a building permit may be placed or stored on public property in the following locations:

901.152—In Front of the Adjoining Site

In the one-third portion of the roadway of the street that is adjacent to the curb in front of the building site for which a permit has been issued; provided that no material or equipment shall be placed or stored within five feet (5') of any rail or any street railway track.

901.153—In the Alley

In the roadway of the street adjoining the building site for which a permit has been issued to the same extent and under the same restrictions as specified in Section 901.16.

A due waiver of claim against the city for damages on account of such placement or storage must be obtained from the owner of such property and filed in the office of the Building Official before such materials or equipment may be placed or stored.

901.154—Public Sidewalk in Front of Building Site

In the alley adjoining the building site for which a permit has been issued, provided that a clear and unobstructed roadway not less than ten feet (10') in width is maintained through such alley along the building site.

901.16—Restrictions to Storage on Public Property

On any portion of the public sidewalk in front of the building site for which a permit has been issued, except on the walkway required to be maintained.

901.17—Mixing Mortar on Public Property

Material and equipment necessary for work to be done under a permit shall not be placed or stored on public property so as to obstruct free and convenient approach to any fire hydrant, fire or police alarm box, any utility box or to any catch-basin or manhole, or so as to interfere with the free flow of water in any street or alley gutter.

901.18—Protection of Utilities

The mixing of mortar or concrete on public property shall be done in a mechanical mixer or in a tight box in such a manner as to prevent dripping or splashing on the public property.

A substantial protective frame and boarding shall be built

around and over every street lamp, utility box, fire or police alarm box, fire hydrant, and every catch-basin and manhole that may be damaged by any work being done under the permit. This protection shall be maintained while such work is being done.

CHAPTER 902

PERMANENT OCCUPANCY OF PUBLIC PROPERTY

902.01—General

No part of any structure or any appendage thereto, except signs, shall project beyond the property line of the building site, except as specified in this Chapter.

The projection or any structure or appendage shall be the distance measured horizontally from the property line to the outermost point of the projection.

902.02—Projection Into Alleys

No part of any structure or any appendage thereto, except signs, shall project into any alley except that a curb or buffer block may project not more than nine inches (9") and not exceed a height of nine inches (9") above grade.

902.03—Space Below Sidewalk

The space adjoining a building below a sidewalk on public property may be used and occupied in connection with the building for any purpose not inconsistent with this code or other laws or ordinances regulating the use and occupancy of such spaces on condition that the right to so use and occupy may be revoked by the authority exercising jurisdiction at any time and that the owner of the building will construct the necessary walls and footings to separate such space from the building and pay all cost and expenses attendant therewith.

902.04—Balconies and Appendages

Oriel windows, balconies, unroofed porches, cornices and belt courses and appendages such as watertables, sills, capitals, bases and other decorative features may project over the public property of the building site a distance as determined by the clearance of the lowest point of the projection above the grade immediately below, as follows:

Clearance above grade less than eight feet (8')—no projection is permitted.

Clearance above grade over eight feet (8')—one inch (1") of projection is permitted for each additional inch of clearance, provided that no such projection shall exceed a distance of four feet (4').

902.05—Marquees

For the purpose of this Section a marquee shall include any object of decoration attached to or a part of said marquee.

No part of any marquee shall be less than two feet (2') from the curb line.

No part of any marquee extending more than two-thirds

of the distance from the property line to the curb line shall be less than ten feet (10') above the ground or pavement below.

No part of any marquee extending not more than two-thirds of the distance from the property line to the curb line shall be less than eight feet (8') above the ground or pavement below.

The length of a marquee which projects more than two-thirds the distance from the property line to curb shall not exceed fifty feet (50') along the direction of the street.

The maximum height or thickness of a marquee measured vertically from its lowest to its highest point shall not exceed three feet (3') when the marquee projects more than two-thirds of the distance from the property line to the curb line and shall not exceed nine feet (9') when the marquee is less than two-thirds of the distance from the property line to the curb line.

A marquee shall be supported entirely from the building.

The roof or any part thereof may be a skylight, provided wire glass is used not less than one-fourth inch ($\frac{1}{4}$ ") thick with no single pane more than eighteen inches (18") wide.

Every roof and skylight of a marquee shall be sloped to downspouts which shall conduct any drainage from the marquee under the sidewalk to the curb.

Every marquee shall be so located as not to interfere with the operation of any exterior standpipe or to obstruct the clear passage of stairways or exits from the building or the installation or maintenance of electroliers.

902.06—Movable Awnings or Hoods

Movable awnings or hoods shall have non-combustible coverings supported on incombustible frames attached to the building.

Such awning or hood may extend over the public property not more than two-thirds the distance from the property line to the nearest curb in front of the building site.

The lowest part of any movable awning or hood frame shall be not less than eight feet (8') above the ground immediately below, and the lowest part of any fringe attached to such awning or hood shall be not less than seven feet (7') above the grade immediately below.

902.07—Doors

Doors in Fire Zones No. 1 and 2, either fully opened or when opening, shall not project more than one foot (1') beyond the property line, except that in alleys no projection beyond property line is permitted. Doors outside the fire district that swing over the property line, shall be maintained normally closed.

ARTICLE X

Heating Apparatus

CHAPTER 1001

ADMINISTRATION AND GENERAL PROVISIONS

1001.01—Scope

The provisions of this Article and chapters and sections thereof, shall apply to the construction, installation, operation and maintenance of heat producing systems, units or apparatus installed in buildings or structures for purposes of maintaining temperature control, production of power or steam, cooking, heating of water and destroying of refuse.

Installations of systems or units in new buildings or structures, and the replacement or alteration of existing systems or units and repairs thereto shall be subject to the provisions of this Article and this Code.

Heat producing systems, units or apparatus, as defined herein and the installation, alteration or repair thereof, shall be subject to the approval of the Building Official, the issuance of required permits and payment of prescribed fees, and provisions of this chapter and the chapter or section specified herein for the type of unit.

Gravity Warm Air Furnace	1002
Pipeless Furnace	1002
Forced Warm Air Furnace	1003
Low Pressure Steam Boiler	1004
High Pressure Steam Boiler	1004
Water Heaters	1005
Commercial Gas Ranges	1005
Incinerators	1005
Fireplaces	1005

1001.02—Minimum Temperatures

Buildings or structures hereafter constructed or erected for human habitation and such existing buildings or structures shall be provided and equipped with a heating system capable of maintaining minimum winter temperatures within all areas or portions of the building or structure of not less than specified in Table No. 1001-A.

1001.03—Chimneys, Vents and Flues

Heating producing systems or units and apparatus or appliances employing an open flame or requiring air for combustion and discharging gases or smoke shall be provided with chimneys, vents and flues as specified in this Code and this Article.

Table No. 1001-A
Minimum Winter Temperatures

Occupancy Use	Degrees Temperature Fahrenheit
Schools:	
Class Rooms—30" above floor line	70—72
Assembly Rooms	68—70
Gymnasiums	60—65
Toilet Rooms	68—70
Wardrobe and Locker Rooms	65—68
Kitchens	68—70
Dining and Lunch Rooms	68—70
Play Rooms	65—68
Natatoriums and Shower Rooms	75—78
Hospitals:	
Private Rooms	70—72
Private Rooms, Surgical	72—80
Operating Rooms	72—90
Wards	68—70
Kitchens and Laundries	65—68
Toilets	68—70
Bath Rooms	74—80
Theatres:	
Seating Space	68—72
Lounge Room	68—72
Toilets	68—70
Hotels:	
Bedrooms and Baths	70—72
Dining Rooms	70
Kitchen and Laundry	66—68
Ballrooms	66—70
Toilets and Service Rooms	68
Apartments	72—74
Offices	68—72
Stores	65—68
Factories and Machine Shops	60—70
Foundries and Boiler Shops	50—60

1001.04—Size and Capacity

The required capacity and size of gravity or forced warm air furnaces or units and units of distribution and intake systems thereof, shall be determined by the heat loss in B.T.U. per hour of each room or area of the building to be heated.

The required capacity and size of the furnace shall be determined by the total heat loss in B.T.U. per hour of all rooms and areas of the building, in addition to the extra load of outside air brought into the system.

Furnaces shall be selected from the Output Rating Tables issued by the manufacturer and ratings shall include both bonnet and register capacities in B.T.U. per hour.

The required capacity and sizes of units of the distribution and intake systems shall be determined by the heat loss in B.T.U. per hour of each room or area of the building.

Recognized and recommended standard sizes of ducts, stacks, leaders, risers, fittings, registers, intakes and other units of the distribution and intake systems shall be used in all installations where practical.

Reference Manuals:

Forced Air Manual and Gravity Manual—National Warm-Air Heating and Air Conditioning Association.

Heating Guide—American Society of Heating and Ventilating Engineers.

1001.05—Gas Fired Installations

Gas fired installations and appliances shall be as approved by the Building Official and may be subject to approval of the American Gas Association.

Gas piping supplying units or appliances and fittings, valves and other accessories shall be constructed and installed in accordance with recognized safety standards.

Units or appliances using liquified petroleum gases as fuel shall be provided with fuel containers, piping, fittings, valves and other accessories constructed or installed in accordance with recognized safety standards.

Units or appliances using liquified petroleum gas or liquified gas-air mixtures as fuel and equipped with pilot lights shall be provided with an approved automatic shut-off valve that will shut off the fuel supply to the unit when the pilot light is extinguished.

1001.06—Oil Fired Installations

Oil burner installations and fuel tanks, piping, fittings, valves and other accessories thereto, shall be constructed and installed in accordance with recognized safety standards.

Fuel tanks shall not be attached to or made an integral part of a unit or appliance, except as approved for self-contained units, and tanks not attached shall be constructed and installed in accordance with recognized safety standards.

Oil burning apparatus using commercial fuel oil, furnace or diesel oil or other flammable liquids shall be constructed and installed in accordance with recognized safety standards.

Stoves, furnaces and other heating or power apparatus in which oil burners are installed shall be constructed and installed as provided for similar units or apparatus using solid fuels.

1001.07—Conversion Gas and Oil Burners

Conversion gas and oil burners shall be as approved and shall be equipped with control devices as provided in this Article and gas conversion installations shall be equipped with an approved draft diverter in the vent pipe.

1001.08—Electrical Wiring

Electrical wiring for controls of units or appliances shall be subject to provisions of prevailing electrical regulations.

Reference Material:

National Electric Code—International Association of Electrical Inspectors.

1001.09—Furnace or Boiler Rooms.

One (1) square inch of free ventilating area (louvers or grills) for each four thousand (4000) B.T.U. fuel input per hour shall be placed in outside walls of rooms or buildings containing the combustion unit to support combustion in oil or coal fired heating equipment.

One (1) square inch of free ventilating area shall be provided for each two thousand (2000) B.T.U. fuel input per hour for gas fired heating equipment.

The furnace room or rooms shall be located in the basement or cellar of any building having a gravity system and the least horizontal dimension of such room shall be six (6) feet. The floor of the furnace room shall be not less than seven (7) feet in the clear below the bottom of the lowest joists of any floor under which lateral heat pipes from the furnace or furnaces are taken and such floor shall be constructed of incombustible materials.

1001.10—Installations in Existing Buildings

The installation, replacement or alteration of heat producing systems, units or apparatus in existing or old buildings shall be subject to the provisions of this article and this section.

Existing stackheads, risers and registers meeting the provision of this Code as to capacity and safety may be used.

Basement return air shall not be allowed where it reduces the amount of air required for combustion or becomes a source of extreme dirt.

CHAPTER 1002

GRAVITY WARM AIR FURNACES

1002.01—Definition

Gravity Warm-Air heating systems shall consist of one or more warm-air furnaces, properly cased, together with necessary warm-air leader pipes, angles, elbows, boots, dampers, stackheads and registers, return-air grilles, boxes, joist pans, ducts, cold air shoes and damper controls.

A gravity warm-air furnace shall consist of a heat exchanger enclosed in a casing of metal or other incombustible material.

1002.02—Controls

Hand Fired Coal.

Manual controls consisting of a regulator and chains attached to draft door and check damper shall be used in lieu of automatic controls.

Automatic controls shall consist of a Thermostat, damper, motor and limit switch.

Barometric check dampers may be used with either manual or automatic controls.

Butterfly Dampers in smoke pipes, when used, shall be installed between the furnace and check dampers.

Gas Fired Furnaces.

Gas-fired furnaces shall be A.G.A. approved and shall be equipped with the following controls: room thermostat, limit switch, safety pilot and switch or valve, automatic control valve, manual shut-off valve in main line, pilot valve, pressure regulator with vent terminating either in flue or within one (1) inch of pilot burner and draft diverter.

Oil Fired Furnaces.

The oil burner shall be underwriters approved and shall be equipped with the following controls: room thermostat, limit switch, barometric damper, ignition safety control on pressure atomizing and rotary burners or a flow control valve on vaporizing pot type burners. A manual shut-off valve shall also be provided near the supply tank.

Stoker Fired Systems.

The following controls are required: room thermostat, limit switch, barometric damper, hold fire control, out-fire control on binfeed stokers.

Limit Switch.

Maximum setting of limit switch shall be set at 250° Fahrenheit.

1002.03—Installation Details

In locating the furnace, due consideration shall be given to equalizing the length of leader pipes, spacing of return-air shoes properly around casing in relation to the capacity of return-air pipe used, minimizing the length of smoke or vent pipe, ease of firing and servicing.

Furnace room floor shall be constructed of brick, cement, or other incombustible material. Where heater room floor is not so constructed, a masonry foundation shall be provided which will extend at least fifteen (15) inches beyond the sides and rear of the casing and thirty-six (36) inches beyond the front of casing.

Where it is necessary to place a furnace on a combustible floor, a minimum of five (5) inches clearance shall be provided between said floor and the bottom of the heat exchanger with provision made for air circulation between the base and the floor. A minimum floor covering of one (1) inch insulation, covered with 24 Gauge galvanized iron with edges turned down to protect insulation, shall be provided in all cases.

Where combustion chamber or ash pit is at a distance of less than five (5) inches from combustible floor, a foundation shall be built up of hollow tile, covered with one (1) inch insulation and galvanized iron, to provide for this clearance. Hollow tile shall be so laid as to provide for continuous air passages through the openings. All foundations shall extend fifteen (15) inches on sides and rear, and thirty-six (36) inches at front of casing.

1002.04—Setting or Assembling of Furnace

The base of the furnace shall be made dust tight. Where tight bottom pans are not provided, this shall be accomplished by grouting in the base. The furnace shall be assembled plumb and level and in a workmanlike manner.

All sections and joints shall be properly fitted. Joints requiring cement or gaskets shall be well fitted and all bolts or metal screws shall be drawn up tightly.

1002.05—Casings

The heat exchanger shall be enclosed in a metal casing.

The casing, casing top or bonnet shall be constructed of sheet metal not lighter than 26 U.S. Standard Gauge. All casing joints shall be of dust tight construction and shall be securely fastened to the fronts. The casing shall be lined or a suitable radiation shield shall be installed between the heat exchanger and the casing to minimize the casing temperature.

The bonnet height shall be such that the largest warm-air pipe can be installed without overhanging. In no case shall the

distance between the top of the heat exchanger and the top of the bonnet be less than eight (8) inches.

1002.06—Insulation Above Furnace

Any furnace, the casing top of which shall come within twelve (12) inches of a combustible floor, ceiling or joist, shall be protected by a metal shield, extending not less than eighteen (18) inches beyond the casing of said furnace. This shield shall be suspended at least two (2) inches below woodwork, allowing free air space between shield and woodwork. No furnace casing or top, coming nearer than six (6) inches of ceiling or joists shall be allowed in any case. All metal casing tops shall be insulated with an air space or covered with magnesia, one (1) inch air cell asbestos, asbestos boiler covering, or sand.

1002.07—Warm Air Basement Pipes

Ducts not enclosed in partitions:

Round Ducts

Diameter Inches	Minimum Weight of Tin	Minimum Thickness of Galvanized Iron
Less Than 12	IC (107 lb.)	30 U.S. Gauge
12 or More	IX (135 lb.)	28 U.S. Gauge

Rectangular Ducts

Width Inches	Minimum Thickness of Galvanized Iron
Less Than 14	28 U.S. Gauge
14 or More	26 U.S. Gauge

When side collars are used the casing top or bonnet must be of sufficient height so that the largest warm air pipe can be taken from side without ovaling.

Linings used inside of ducts shall be fire-resistive.

Joints and seams of such ducts shall be securely fastened and made substantially air tight. Slip joints shall have a lap of at least one (1) inch, and be individually fastened.

Such ducts shall be securely supported by metal hangers, straps, lugs, or brackets. No nails shall be driven through the duct walls and no unnecessary holes shall be cut therein.

All warm air pipes in the basement shall be provided with dampers supported on both sides and as near the casing as possible. Dampers in elbows, when used, shall have bearings in line with radius of turn.

Where warm air pipes pass through a masonry wall an air space of one-half ($\frac{1}{2}$) inch must be provided around the pipe. This air space may be filled with non-combustible insulation.

Where warm air pipes pass through or into unheated

spaces separated from the furnace room, it is recommended that they shall be insulated.

Portions of such ducts which run in the open, such as those which run approximately horizontal and near the ceiling, shall have clearances as follows:

From metal ducts to combustible material, including wood lath and plaster—not less than one (1) inch;

From metal ducts to metal lath and plaster or other non-combustible finish attached to combustible material—not less than one-fourth ($\frac{1}{4}$) inch;

For metal ducts covered with one-half ($\frac{1}{2}$) inch or more of non-combustible insulating material—no clearance required;

From ducts made of asbestos-cement or equivalent to combustible material—one-half that specified for metal ducts.

1002.08—Wall Stacks or Risers

Warm air risers shall be constructed entirely of non-combustible material equivalent in structural strength and durability to the following:

Width Inches	Minimum Weight of Tin	Minimum Thickness of Galvanized Iron
14 or Less	IC (107 lb.)	30 U.S. Gauge
Over 14	IX (135) lb.)	28 U.S. Gauge

Where such ducts enter the floor of the first story above that in which the furnace is situated, they shall be separated from all combustible material in the floor construction by at least one-fourth ($\frac{1}{4}$) inch, where possible, unless the duct is of double-wall construction with a continuous air space of not less than one-fourth ($\frac{1}{4}$) inch between the inner and outer walls. Any remaining space around the duct where it enters the floor, whether the duct is single or double-wall construction, shall be tightly filled with asbestos-cement or other non-combustible insulating material.

Where such ducts are enclosed in combustible partitions, wall or concealed ceiling spaces, they shall be;

Covered with not less than one thickness of asbestos paper weighing not less than twelve (12) pounds per hundred square feet, with an air space of not less than one-fourth ($\frac{1}{4}$) inch if possible, provided between the duct and combustible material, unless a non-combustible insulating covering of cellular type at least one-fourth ($\frac{1}{4}$) inch thick is provided. (In metal lath and plaster or rock lath and plaster partitions no air space is needed except from wood studs.)

Or made double with a continuous air space of not less

than one-fourth ($\frac{1}{4}$) inch between the inner and outer walls.

Or, be of one-fourth ($\frac{1}{4}$) inch thick asbestos-cement or equivalent, separated from combustible material by an air space of at least one-eighth ($\frac{1}{8}$) inch.

Where such ducts are located in closets, they shall be insulated.

Where such ducts pass through, pierce a wall or partition of combustible construction, they shall be covered with not less than one-fourth ($\frac{1}{4}$) inch Aircell Asbestos insulation or its equivalent. A metal thimble may be used to provide the double wall if the space between the duct and the thimble is not less than one (1) inch. This space may be filled with non-combustible material or closed with metal collars.

Where the installation of such ducts in walls, floors, or partitions requires the removal of any fire-stopping, the space around the duct, both at the top and the bottom, shall be tightly stopped with asbestos, mineral wool and other non-combustible insulation material.

Warm air pipes, stocks and fittings shall not be located in outside walls unless insulated where at all possible.

All risers shall be braced in such a manner as not to obstruct the flow of air but to retain the full capacity throughout.

1002.09—Registers

When baseboard or wall registers are used, they shall be properly sealed to the stackhead in such a manner as to prevent any leakage of air between the head and the register.

Warm air registers shall not be placed on outside walls unless risers and register boxes are insulated.

For any system having not more than two warm air openings, at least one of these openings shall be without valve or louvers and the pipe thereto shall be without damper.

1002.10—Return Air Supply to Furnace

Return air shall be conducted to the heater through a continuous system of ducts. Air shall not be recirculated from any basement section not used for living quarters.

The air supply to the furnace may be taken from within the building or may be taken partially from outside and partially from within. All joints in the duct system should be made dust tight.

Portions of return air ducts within six (6) feet of the heater shall be constructed entirely of metal of the following weights or gauges:

Ducts Not Enclosed in Partitions Round Ducts

Diameter Inches	Minimum Weight of Tin	Minimum Thickness of Galvanized Iron
Less Than 12	IC (107 lb.)	30 U.S. Gauge
12 or More	IX (135 lb.)	28 U.S. Gauge

Rectangular Ducts

Width Inches	Minimum Thickness of Galvanized Iron
Less Than 14	28 U.S. Gauge
14 or More	26 U.S. Gauge

Ducts Enclosed In Partitions

Width Inches	Minimum Weight of Tin	Minimum Thickness of Galvanized Iron
14 or Less	IC (107 lb.)	30 U.S. Gauge
Over 14	IX (135 lb.)	28 U.S. Gauge

All other return air ducts may be constructed of metal, or one (1) inch (nominal) wood boards, or other suitable material, provided that no material more flammable than one (1) inch wood boards shall be used.

Where the installation of such ducts in walls, floors, or partitions requires the removal of any fire-stopping spaces around the duct, both the top and the bottom shall be tightly stopped with asbestos, mineral wool, or other non-combustible insulation material.

Where spaces between studs in walls or partitions, or spaces between joists in floors are used as ducts, the portions of such spaces so used shall be cut off from all remaining unused portions by tight fitting stops of sheet metal or of wood not less than two (2) inches thick.

The interior of combustible ducts shall be lined with metal at points where there might be danger from incandescent particles dropped through the register, such as directly under floor registers and at bottom of vertical ducts.

No vertical stack for return air shall be connected to registers on more than one floor.

Where a boot or shoe is connected to the casing at the base, the opening shall not extend higher than a line on the level of the top of the grate of a coal fired furnace, the top of the hearth of oil fired furnaces, or the burner line of gas equipment, unless suitable radiation baffles are provided. The width of the shoe shall be of proper measurement to make the area at all points at least equal to that of the round or square pipe.

Wherever the space between joists is used to convey return air over head, all bridging and bracing shall be removed and a dust proof sheet metal bottom shall be constructed. If more area is required two (2) or more spaces may be used or a pan may be constructed to extend below the joist to obtain the required area. The connection from this pan to the boot or shoes shall be made of galvanized iron not lighter than No. 26 U.S. Standard Gauge. Care shall be exercised to make all inside surfaces as smooth as possible.

Return air faces shall have a free area equal to or greater than that of the duct to which it attaches.

Where a return air face is placed in a seat or side wall, the open work of the face must extend down to within one (1) inch of the floor and the throat opening to the basement duct work shall be at least equal to the required basement duct area. No vertical return air face shall extend more than fourteen (14) inches above the floor line.

1002.11—Smoke or Vent Pipe

The smoke or vent pipe shall be as short and direct as consistent with the location of the furnace. It shall be made of metal not lighter than No. 24 U.S. Standard Gauge, and installed in accordance with furnace manufacturers recommendation. It must have no opening for attaching fireplace, stove, range, water heater, gas or ventilating connection. It shall be lock seamed or riveted; all joints shall slip not less than one and one-half ($1\frac{1}{2}$) inches and it shall be rigidly secured. Cast-iron pipe may be used.

Where the smoke or vent pipe enters the flue, a thimble shall be cemented into the flue and the connections thereto made gas tight. Should any smoke pipe come within 18 inches of any combustible material, such combustible material must be covered with asbestos paper, and a metal shield so fastened that a two (2) inch air space exists between this shield and the combustible material. This shield shall be no less in size than twice the diameter of the smoke pipe and of sufficient length to cover the combustible material at all points.

No smoke pipe shall project through an external wall or window. No furnace connection is to be made to a flue without a cast iron or steel cleanout having first been provided in the flue.

The smoke or vent pipe shall extend into the chimney thimble at least two (2) inches but must not protrude through the liner.

Smoke pipes shall not be covered with insulating material or otherwise concealed from view.

1002.12—Pipeless Furnaces

When but one duplex grating is used for both warm air and return air in a so-called pipeless furnace, the area of the warm-air outlet of the grating provisions relative to casings shall not govern when this type of furnace is installed, but the following specifications shall be followed: The inner casing of this type of furnace may be made of either black or galvanized iron no lighter than No. 26 U.S. Standard Gauge. The outer casing must be made of galvanized iron not lighter than No. 26 U.S. Gauge. A uniform air space shall be maintained at all points between the inner and outer casing. In no case shall the top of the heat exchanger be allowed closer than twelve (12) inches to any ceiling or joists above the furnace.

Where joists are cut to accommodate this furnace, headers shall be put in and braced.

The furnace size shall be selected from the manufacturers rating tables.

Where one warm air register is used directly above the furnace and one (1) or more return-air supplies are to be installed, the furnace capacity shall be considered to be the bonnet capacity of said furnace. The warm air collar area and the free area of the warm air grille shall be equal to or greater than the value obtained when the bonnet B.T.U. is divided by 300 (Bonnet B.T.P. $300 = \text{sq. in.}$).

The return air system for such an installation shall be in accordance with Section 1002.10.

All installation precautions of this chapter shall apply.

CHAPTER 1003

FORCED AIR WARM AIR FURNACES

1003.01—Definition

Warm air, Winter Air Conditioning Systems shall consist of one or more warm air heat exchangers within individual housings, or within one common housing; one or more motor-driven blowers; smoke or vent pipes; individual leader pipes or trunk line systems, or both; with necessary locking type dampers for warm air and return air lines; automatic controls; registers and intakes; filters or air washers; humidifiers and any other appurtenances as may be required.

An individual supply system shall consist of separate ducts, of round or rectangular cross sections, extending from the heating unit.

A trunk line system consists of one (1) or more main ducts with branches.

Return ducts are a part of the recirculating system and may be individual or trunk lines, or a combination of both.

The blower shall be of the pressure type with self-aligning bearings, resilient mounted and grounded against radio interference.

The motor shall be of "long hour duty" type, resilient mounted.

Filters shall fit to form a tight seal. The filter area shall be such that the velocity through the filter will not exceed three hundred (300) feet per minute.

Air filters shall be of a type that will not burn freely or emit large volumes of smoke or other objectionable products of combustion when attacked by flames. Liquid adhesive coating used on filters shall have a flash point of 350°F. Cleveland open cup tester, or higher.

Air washers or electric precipitation types shall conform to the manufacturer's specifications.

1003.02—Controls

Hand Fired Systems

Manual controls consisting of a regulator and chains attached to draft door and check damper shall be used in lieu of automatic controls plus automatic fan switch.

Automatic controls shall consist of a Thermostat, damper motor and limit switch with automatic fan switch.

Barometric check dampers may be used with either manual or automatic controls.

Butterfly Dampers in smoke pipes, when used, shall be installed between the furnace and check dampers.

Gas Fired Systems.

The controls shall consist of a room thermostat, limit switch, fan switch, automatic control valve, safety pilot and switch or valve, pressure regulator, manual gas cock and pilot cock. Gas supply shall automatically be cut off with electric failure or failure of pilot flame. A draft diverter shall be installed.

Pressure regulators and gas valves requiring vents shall be either vented into chimney or combustion chamber near pilot burner.

Oil Fired Systems.

Pressure atomizing burners and rotary wall flame burners shall be controlled by a room thermostat, limit switch, fan switch, ignition safety switch and barometric damper or blower to be controlled to conform to manufacturer's specifications. A manual valve shall be placed in the fuel oil line near the source of supply.

Vaporizing pot-type burners shall be controlled by a room thermostat, limit switch, fan switch, flow control valve and barometric damper. A manual valve shall be placed in the fuel oil line near the source of supply.

Stoker Fired Systems.

The controls for a stoker fired system shall consist of a room thermostat, limit switch, fan switch, hold fire control and barometric damper. Bin feed stokers shall in addition to above, be equipped with an out-fire control.

Limit Switch

Maximum setting of limit controls shall be fixed at 200°F.

The fan and limit switches should be located high in the plenum chamber near the duct that leads to the highest register of the system.

Where the manufacturer has provided for fan and limit switch installation in unit cabinet the manufacturer's locations and recommended settings shall be adhered to.

Unless provided for in the automatic control system, a manual switch, for summer operation of the blower, may be placed in some accessible location, approximately three (3) feet above the normal light switch elevation. This switch shall be wired so that it operates the blower independently of the bonnet control.

Electric Circuit For Heating Equipment

A separate, fused, electrical circuit of proper voltage and capacity shall be run from the house service to a separate panel. This panel shall be for heating equipment only.

1003.03—Installation Details

In locating the unit consideration shall be given to the proximity of the chimney and fuel room door. Care shall

also be exercised in allowing for ease of servicing.

The floor upon which the unit is to be placed shall be constructed of brick, cement, or other incombustible material. Where heater room floor is not so constructed, a masonry foundation shall be provided which will extend at least fifteen (15) inches beyond the sides and rear of casing and thirty-six (36) inches beyond the front of casing.

Where it is necessary to place a furnace on a combustible floor, a minimum of five (5) inches clearance shall be provided between said floor and the bottom of the heat exchanger with provision made for an air space between the base and the floor. A minimum floor covering of one (1) inch insulation, covered with 24 Gauge galvanized iron with edges turned down to protect insulation, shall be provided in all cases.

Where combustion chamber or ash pit is at a distance of less than five (5) inches from combustible floor, a foundation shall be built up of hollow tile, covered with one (1) inch insulation and galvanized iron, to provide for this clearance. Hollow tile shall be so laid as to provide for continuous air passages through the openings. All foundations shall extend fifteen (15) inches on sides and rear and thirty-six (36) inches at front of casing.

When units are to be placed in closets, no portion of the cabinet or vent pipe shall be nearer than six (6) inches to the walls or door. Such closets shall be of fire proof wall, ceiling and floor construction. The floor shall conform with the construction details contained above.

1003.04—Setting or Assembling of Furnace

The base of the unit cabinet shall be of dust-tight construction and shall be set level and the cabinet panels shall be sealed at the floor in a dust-tight manner.

The unit shall be set plumb and in a workmanlike manner. All sections and joints shall be properly fitted. Joints or flanges requiring cement or gaskets shall be well fitted and all bolts or metal screws shall be drawn up tightly.

1003.05—Casings

The heat exchanger and blower shall be encased in a metal cabinet, so constructed as to be dust tight.

1003.06—Insulation Above Furnace

Any furnace, the casing top of which shall come within twelve (12) inches of a combustible floor, ceiling or joist, shall be protected by a metal shield, extending not less than eighteen (18) inches beyond the casing of said furnace. This shield shall be suspended at least two (2) inches below woodwork, allowing free air space between shield and woodwork. No furnace casing or top, coming nearer than six (6)

inches of ceiling or joists shall be allowed in any case. All metal casing tops shall be insulated with an air space or covered with magnesia, one (1) inch air cell asbestos, asbestos boiler covering, or sand.

1003.07—Warm Air Basement Pipes

Round Pipe.

Round pipe shall be constructed of galvanized iron: up to and including twelve (12) inches, not lighter than 30 gauge; up to and including twenty-four (24) inches, not lighter than 26 gauge.

If slip joints are used, joints shall be stripped with asbestos paper.

Rectangular ducts.

Rectangular ducts shall be constructed of galvanized iron: up to and including fourteen (14) inches wide, not lighter than 28 gauge; to thirty-six (36) inches wide, not lighter than 26 gauge; wider than thirty-six (36) inches, not lighter than 24 gauge.

All duct sections twenty-four (24) inches, or wider, and over forty-eight (48) inches in length, shall be cross broke on top and bottom and shall have standing seams or angle iron braces.

No warm air duct, round or rectangular, shall come in contact with masonry walls. Insulate around all warm air ducts through masonry walls.

Joints and seams of such ducts shall be securely fastened and made substantially air tight. Slip joints shall have a lap of at least one inch, and be individually fastened.

Linings used inside of ducts shall be fire-resistive.

Such ducts shall be securely supported by metal hangers, straps, lugs, or brackets. No nails shall be driven through the duct walls and no unnecessary holes shall be cut therein.

Portions of such ducts which run in the open, such as those which run approximately horizontal and near the ceiling, shall have clearances as follows:

From metal ducts to combustible material, including wood lath and plaster—not less than one (1) inch;

From metal ducts to metal lath and plaster or other non-combustible finish attached to combustible material—not less than one-fourth ($\frac{1}{4}$) inch.

For metal ducts covered with one-half ($\frac{1}{2}$) inch or more of non-combustible insulating material—no clearance required;

From ducts made of asbestos-cement or equivalent to combustible material—one half that specified for metal ducts.

1003.08—Wall Stacks or Risers

Ducts enclosed in partitions shall be constructed of the weights or gauges stated below.

Width Inches	Minimum Weight of Tin	Minimum Thickness of Galvanized Iron
14 or less	IC (107 lb.)	30 U.S. Gauge
Over 14	IX (135 lb.)	28 U.S. Gauge

Joints and seams shall be securely fastened and joints shall be stripped with asbestos paper.

Such ducts shall be securely supported by metal hangers, straps, lugs, or brackets. No nails shall be driven through the duct walls and no unnecessary holes shall be cut therein.

Where such ducts enter the floor of the first story above that in which the furnace is situated, the space around the duct at such points shall be tightly filled with asbestos cement or other non-combustible insulating material.

Where such ducts enter floor, partition or enclosure of combustible construction within a horizontal distance of six (6) feet from the furnace, they shall be separated from the combustible construction where possible, by at least one-fourth ($\frac{1}{4}$) inch for a distance of six (6) feet from the primary heating surface of the furnace. This space at the point where it enters the floor or partition shall be tightly filled with asbestos cement or other non-combustible insulating material.

Where such ducts are located in closets they shall be insulated with an approved fire-resistive insulating covering.

Where the installation of such ducts in walls, floors, or partitions requires the removal of any fire stopping, the spaces around the duct, at top and bottom, shall be tightly stopped with asbestos, mineral wool or other non-combustible insulation material.

All exposed warm air ducts passing through an unheated room, shall be insulated. Ducts located in cold attic spaces, or cold exposed basement spaces, shall be insulated with at least one (1) inch thickness of insulation. Risers in outside walls—one-half ($\frac{1}{2}$) inch.

1003.09—Registers

When baseboard or wall registers are used, they shall be properly sealed to the stackhead in such a manner as to prevent any leakage of air between the head and the register.

Warm air registers shall not be placed on outside walls unless risers and register boxes are insulated.

1003.10—Return Air System

Return air shall be conducted to the heater through continuous ducts, except that under floor spaces may be used

as ducts for return of air from rooms directly above provided such spaces are not over two (2) feet in height to bottom of floor joists and are cleaned of all combustible material and are tightly and substantially enclosed. Air shall not be recirculated from any basement section not used for living quarters.

All other return air ducts may be constructed of metal, or one (1) inch (nominal) wood boards, or other suitable material, provided that no material more flammable than one (1) inch wood boards shall be used.

Where the installation of such ducts in walls, floors, or partitions requires the removal of any fire-stopping, the spaces at top and bottom shall be tightly stopped with asbestos, mineral wool or other non-combustible insulation material.

Where spaces between studs in walls or partitions, or spaces between joists in floors are used as ducts, the portions of such spaces so used shall be cut off from all remaining unused portions by tight fitting stops of sheet metal or of wood not less than two (2) inches thick. Bottoms of all return air joist spaces shall be lined with smooth, air-tight material. All cross bracing should be removed and joists properly reinforced.

The interior of combustible ducts shall be lined with metal at points where there might be danger from incandescent particles dropped through the register, such as directly under floor registers and at bottom of vertical ducts.

No vertical stack for return air shall be connected to registers on more than one (1) floor.

All ducts shall be securely suspended from adjacent building members. No nails shall be driven through duct or stack walls, and no unnecessary holes shall be cut therein.

1003.11—Dampers

Volume dampers of locking type shall be placed in each warm air run. These may be placed near the main trunk, or in the stack-head.

Return air ducts and outside air inlet ducts shall be similarly equipped with volume dampers.

1003.12—Smoke or Vent Pipe

The smoke or vent pipe shall be as short and direct as consistent with the location of the furnace. It shall be made of metal not lighter than No. 24 U.S. Standard Gauge, and installed in accordance with manufacturer's recommendations. It must have no opening for attaching fireplace, stove, range, water heater, gas or ventilating connection. It shall be lock seamed or riveted; all joints shall lap not less than

one and one-half (1½) inches and it shall be rigidly secured. Cast-iron pipe may be used.

Where the smoke or vent pipe enters the flue, a thimble shall be cemented into the flue and the connections thereto made gas tight. Should any smoke pipe come within eighteen (18) inches of any combustible material, such combustible material must be covered with asbestos paper, and a metal shield so fastened that a two (2) inch air space exists between this shield and the combustible material. This shield shall be no less in size than twice the diameter of the smoke pipe and for sufficient length to cover the combustible material at all points.

No smoke pipe shall project through any external wall or window.

The smoke or vent pipe shall extend into the chimney thimble at least two (2) inches but must not protrude through the liner, or obstruct free passage of gases.

Smoke pipes shall not be covered with insulating material or otherwise concealed from view.

CHAPTER 1004

STEAM AND BOILERS

1004.01—Low Pressure Steam Heating Plants

Steam hot water heating plants, for not more than fifteen (15) pounds pressure, and hot water heaters using solid or liquid fuel, shall rest upon masonry or reinforced concrete floors and shall be protected on the outside by asbestos. The clearance of wooden partitions, ceilings, and other combustible materials shall be the same as given for warm air furnaces.

1004.02—Boilers

Large boilers for power or steam purposes or for generating high pressure steam shall be so located that no wood or other combustible material shall be less than five (5) feet from the top or sides or ten (10) feet from the front of such apparatus and all combustible material less than ten (10) feet from the top or sides or less than twenty (20) feet from the front shall be protected with at least four (4) inches of concrete, brick or other similar incombustible material and shall be well ventilated to prevent the temperature rising above 125°F. Steel, cast iron or concrete columns adjacent to such boilers shall not be in direct contact with furnace settings but there shall be an open and unobstructed space at least four (4) inches wide for ventilation.

A boiler, if placed in the basement of a building, shall be located in an isolated apartment having brick or concrete walls and floors and one-hour fire-resistive ceiling. Openings from boiler room to main building shall be fully protected by approved automatic fire doors; if placed in an exterior building, such building should either be detached at least twenty-five (25) feet or have exposed or adjoining walls treated as fire walls. Floor of boiler room shall be of fire-resistive material.



CHAPTER 1005

STOVES, RANGES, HOT WATER HEATERS AND
INCINERATORS

1005.01—Stoves

All stoves used for heating, cooking or laundry purposes using solid or liquid fuel shall have all combustible partitions in back of and extending not less than twelve (12) inches beyond each side of such stove protected by not less than one-hour fire-resistive construction. Such stoves shall be securely supported at least twelve (12) inches above any wood floors by metal supports and there shall be a metal and asbestos pad at least three-eighths ($\frac{3}{8}$) inch thick below such stove extending at least six (6) inches beyond each side and at least twelve (12) inches in front of such stove. Such stove shall not be placed nearer than six (6) inches to any combustible partition.

All such stoves shall be connected by a smoke pipe to a chimney.

1005.02—Domestic Water Heaters and Ranges

Gas ranges, domestic hot water heaters and hot plates shall be supported at least six (6) inches above any wood floor or other combustible material and where burners are not provided with a shield below, the wood or other combustible material shall be protected with a double metal shield with a one (1) inch air space between or with a one-half ($\frac{1}{2}$) inch pad of metal and asbestos. Combustible partitions or walls within six (6) inches of any gas range, hot plate or ordinary domestic hot water heater, and within three (3) inches of any approved domestic automatic storage hot water heater shall be protected by one-fourth ($\frac{1}{4}$) inch of asbestos, covered with a 26 U.S. gauge metal covering or shall have not less than a one-hour fire-resistive protection, provided that approved domestic gas ranges of the fully insulated type shall be exempt from the foregoing requirements. Wood ceiling or other combustible materials shall be at least three (3) feet above such installations.

All water heaters shall be connected to a vent pipe or to a regulation chimney.

In the kitchen of every building hereafter erected there shall be provided a chimney and a vent, or in lieu of such chimney or vent, when approved by the Building Official, there may be installed in the wall or ceiling approximately over the gas outlet, a ventilating opening with an area of not less than six (6) inches by eight (8) inches, connected to a ventilating duct leading to the outside air, such duct for each kitchen to be not less than twenty-four (24) square inches in cross-sectional area. An approved system of forced

draft ventilation may be substituted for the natural draft ventilating system.

1005.03—Commercial Gas Ranges

Gas ranges for restaurants, bakeries or hotels shall be protected by a metal shield or such ranges may rest on and if less than twelve (12) inches above the floor, the wood shall be protected by a metal shield or such ranges may rest on a steel and masonry support. Such ranges shall not be placed nearer to any wood partitions or other combustible material than six (6) inches and if nearer than twelve (12) inches such partitions shall be protected with a metal or asbestos shield.

The distance from any such range to any wood ceiling or other combustible material above shall not be less than twelve (12) inches and if less than three (3) feet the ceiling or combustible material above shall be protected with a double metal shield with one (1) inch air space between or with one (1) inch of metal lath and portland cement plaster or one (1) inch of asbestos.

Hood and ventilating flues from such ranges may be of sheet metal or masonry and if of sheet metal shall be protected from all wood or other combustible materials by four (4) inches of concrete, gypsum or terra cotta tile or an eight (8) inch air space and a metal shield. Such ventilating flues shall not be carried through wood floors or up combustible partitions unless protected by at least four (4) inches of masonry or concrete.

1005.04—Incinerators

All incinerators which are built as an integral part of the building shall have the enclosing walls of the fire boxes or combustion chamber of solid masonry or reinforced concrete not less than eight (8) inches in thickness where the horizontal area does not exceed fifteen (15) square feet and not less than twelve (12) inches in thickness where the combustion chamber is of greater area. The inner four (4) inches of such combustion chamber walls shall be of fire brick laid in fire clay or cement mortar, except that the walls surrounding the ash chamber below the fire grate need not be so lined. The inner walls of any combustion chamber shall not be offset in excess of one (1) inch for every three (3) inches of rise in the height of the wall unless supported by reinforced concrete or structural steel.

The chimney for every incinerator shall be constructed as specified in this Code, with an approved spark arrestor placed over the top of the chimney.

1005.05—Fireplaces

Fireplaces shall be constructed, installed and equipped as

provided in this Code.

Reference: Section 709.06.

1005.06—Miscellaneous Heating Apparatus

Other sources of heat and flame not specifically mentioned herein shall be constructed and so protected as to prevent heating any wood or other combustible material used in the construction of floors, ceilings, partitions or other parts of a building to a temperature of over 125°F., when in full operation, and shall be so constructed as not to be liable to undue corrosion or deterioration and not subject to accidental overturn or other disarrangement conducive to dangerous conditions.

Ninety (90) degree bends in round pipe shall be made by not less than four (4) piece elbows. Sixty (60) degree bends shall be made by means of not less than three (3) piece elbows. All warm air pipes and fittings, cold air or recirculating pipes, ducts, boxes and fittings shall be made of bright tin or galvanized iron. All such appurtenances except leader heat pipes under the first floor shall be covered with two (2) thicknesses of asbestos paper weighing at least eight (8) pounds to one hundred (100) square feet or with air-cell asbestos insulation, or shall be double walled with a one-fourth ($\frac{1}{4}$) inch space between the inner and outer walls. Horizontal warm air pipes shall be kept at least three (3) inches from any combustible material or shall be protected with an asbestos shield and a one (1) inch air space. Air-cell asbestos paper not less than one-fourth ($\frac{1}{4}$) inch in thickness shall be securely cemented around all leader pipes.

All riser pipes shall be braced or held in place by means of metal strips securely fastened to the pipe and shall in no case be held in place by nailing diagonally through the corners of such pipe. No joint shall depend wholly upon solder to make it tight. All leader pipes shall be securely fastened in place by means of wires or metal strips.

In the installation of Y runs or branch runs the cross sectional area of the warm air pipe at the furnace shall equal in square inches the cubic contents of all the rooms served by such warm air pipe divided by forty (40). Sizes of branch runs shall be determined in the same manner on the basis of the room or rooms served. Branches from trunk lines shall be taken off in a generally horizontal plane at an angle not more than forty-five (45) degrees from the line of the pipe. Fifteen (15) degree Y branches may be permitted in forced draft systems. Riser pipes shall not be taken off the top of the first floor register boxes.

Where warm air pipes and apurtenances are to be installed in a building the joists and studs shall be so arranged

as to provide not less than fourteen (14) inches clear space in continuous horizontal runs and/or vertical risers from the furnace to the register served.

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